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ORIGINAL

PATH OF INTEGRATION OF SPORTS AND MEDICINE TO PROMOTE HEALTH OF THE ELDERLY IN CONTEXT OF HEALTHY CHINA

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ABSTRACT

"Health for all" is the theme of the Healthy China strategy. The unification of sports and medicine is an effective means to promote "Health for all", and it has also become one of the important measures of the Healthy China strategy. The closed loop of health escort formed by it is of great significance to the implementation of the Healthy China strategy. At the same time, the problem of population aging is becoming more and more serious. This paper aims to study how to analyze and study the health path of the elderly in the context of healthy China and describe the natural language processing (NLP). This paper raises the question of the health pathway in old age. This issue is based on the integration of healthy China and physical medicine. It expounds the concept of NLP and related algorithms, and designs and analyzes the case design and analysis of the integration of sports and medicine to promote the health of elderly services. Through the research of the questionnaire survey method, it can be found that the number of elderly people in the survey sample who have not received the guidance of the integration of sports and medicine to promote health services accounts for as high as 51.47%, and the implementation is not enough. In fact, from the perspective of human health, the integration of sports and medicine is also a must for health promotion.

KEYWORDS: Healthy China, Integration of Sports and Medicine, Elderly Health, Path Research

1. INTRODUCTION

In the process of stable development of the country and society, the

concept of healthy China has been vigorously advocated and recognized by the people, and citizens' health awareness has been continuously improved and enhanced. It changes people's inherent living conditions through reasonable physical exercise, which enables people to break away from the hectic living environment and establish a scientific and healthy outlook on life. It makes people gradually change from the pursuit of material life to the pursuit of spiritual culture, which is an irreversible trend in the development of contemporary society. Health is the eternal need of human beings. The purpose and function of "integration of sports and medicine" is to combine the knowledge of medicine and the means of sports. By guiding others to exercise scientifically to play their role in disease prevention and recovery, it is based on promoting people's physical and mental health and mastering the knowledge of healthy exercise as the starting point and destination. Under the background of the Healthy China strategy, it is of great practical significance to explore the development path of the integration of sports and medicine to promote the health of the elderly. It aims to provide theoretical reference and practical guidance for promoting the development process of the integration of sports and medicine, fully implementing the Healthy China Strategy, and promoting the health of the elderly. Through the method of questionnaire survey, the organization and publicity that can obtain the integration of sports and medical services is not in place. The elderly still have a relatively large demand for the integration of sports and medicine to promote elderly health services. The innovations of this paper are as follows: (1) This paper combines the integration of sports and medicine with the elderly health path, and introduces the theory and related methods of NLP in detail. It mainly introduces support vector machines and convolutional neural networks. (2) In the face of the questionnaire survey data, this paper conducts research from three aspects: the status quo, the problem and the path.

2. Related Work

Population aging has become a major social problem worldwide. Xu Y analyzed healthy old age care and sports for the elderly in the context of population aging (Xu, 2018). The aim of this study by Almonacid-Fierro A was to explore social representations built around the quality of life of older adults who participated in physical activity and health-oriented exercise workshops (Almonacid-Fierro et al., 2021). Aus D K aimed to provide high-quality physical health assessment and treatment for elderly mentally ill patients (Aus et al., 2021). The main objective of the Mishra study was to compare the health of older adults living in two nursing home complexes: private and government (Mishra, 2018). Based on a life course perspective, Ignacio assessed the associations between three social strengths and weaknesses accumulated at different life stages. He also assessed the number of self-reported chronic diseases in women over the age of 60 in Chile, a Latin American country (Madero-Cabib et al., 2019). However, a detailed pathway for promoting health

in old age has not been clearly proposed. NLP is a powerful machine learning technique that maximizes data extraction from complex text. Balsmeieri B leveraged the latest advances in machine learning and NLP to introduce new tools. It can automatically acquire, parse, disambiguate and build updated databases using US patent data (Balsmeier et al., 2018). Kjell ONE developed an approach using open-ended questions in which responses were analyzed using NLP (latent semantic analysis) (Kjell et al., 2019). Pirrelli V aimed to evaluate, analyze and compare the feature output performance of the most popular MFCC variants for text-independent speaker recognition in VoIP networks (Pirrelli & Zarghili, 2017). Hang L summarized recent advances in deep learning for NLP and discusses its advantages and challenges (Hang, 2018). The performance of these algorithms needs to be improved.

3. NLP Approach for Elderly Health

3.1 Integration of Physical and Medical

(1) Concept: "Integration of sports and medicine" is a mature stage for exploring and improving "integration of sports and medicine". It is not only the interaction and integration of sports methods and modern medical concepts and medical technology methods, but also the mutual learning and promotion of technology and talents. It has the characteristics of pertinence, practicability and scientific, and maximizes its comprehensive benefits (Hernandez-Boussard et al., 2017).

(2) Mode: Regarding the concept of the integrated service model of sports and medicine, some scholars believe that there are few studies on the integrated service model of sports and medicine at this stage. It is different from the sports public service model and the medical service model. It is an emerging health public service supply model. Some scholars also believed that the service model of physical and medical integration refers to giving full play to the health-promoting role of physical fitness and exploring the medical value of scientific sports. It combines the scientific movement with clinical medicine to provide the process of public health services (Névéol & Zweigenbaum, 2017). Combined with previous research, it defines the service model of physical and medical integration as follows. In the context of the deep integration of national fitness and national health, the multi-dimensional medical service organization deeply integrates sports and medical care in value concepts, methods, science and technology, platform paths and other resource elements. It gives full play to the health-promoting functions of the body. Combined with the previous research results, combined with the sorting out and field investigation of the current sports-medical integration service model in China, this paper finds that the types, connotations and subjects of sports-medical integration service models in various regions of China are diverse. The integration of sports and medicine has not formed a fixed service model. Although most typical cases

have regional characteristics, their core content is almost inseparable from physical fitness testing and exercise prescription. These two are gradually accepted and promoted as the basic practice methods of physical and medical integration with the proposal of relevant policies. No matter what kind of body-medicine integration service, patients can get a correct assessment of their own health level through relevant physical health tests, and then doctors or sports instructors can choose appropriate exercise prescriptions.

3.2 Natural Language Processing (NLP)

(1) Overview of NLP: As an important tool for human-to-human communication, natural language mainly deals with words, paragraphs or chapters. The main methods used are divided into rule-based and statistics-based (AlRababah, 2017; Downs et al., 2018).

(2) NLP flow: As shown in Figure 1, the NLP process can be roughly divided into five steps: 1) It downloads text through a web browser or a local input program. 2) It preprocesses the text, segmenting the text, removing patterns and ending words. 3) It describes the features of the text and uses word encoding or embedding techniques to match words to their respective vector word formats. 4) For model training, machine learning model algorithms, such as vector support machines, decision trees, proximity or logistic regression algorithms, or deep learning model algorithms can be used. 5) It uses the test set to validate the trained model and evaluate the strengths and weaknesses of the model algorithm.

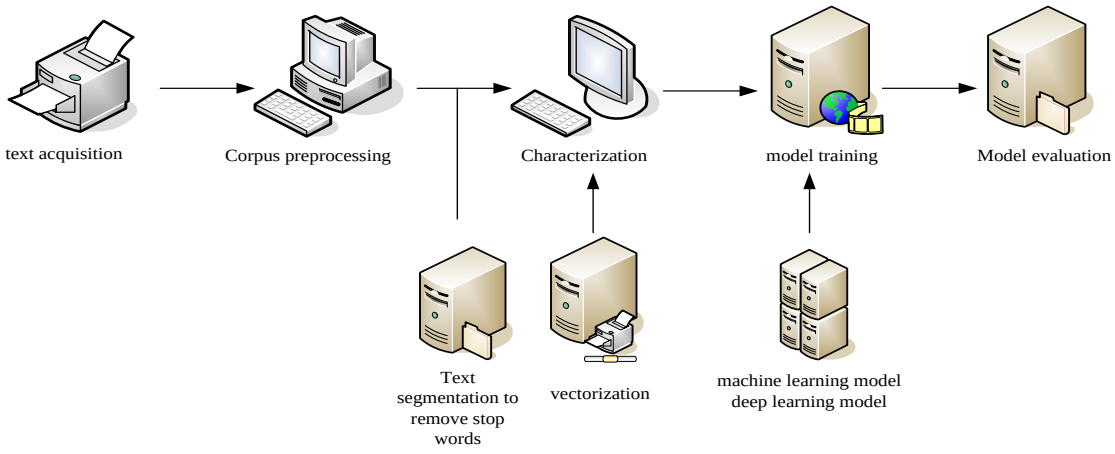


Figure 1: NLP flowchart

(3) Statistical model of NLP: 1) Conditional probability and Bayesian formula: In probability statistics, calculating the probability of a random event given that other events have already occurred. This probability is called conditional probability. The probability of random event M=m is represented by P(m). P(M=m, N=n) is abbreviated as P(m,n), which represents the probability that M=m and N=n occur at the same time, which is also called the joint

probability distribution. It records the probability of N occurrence under M conditions as P(N|M), and the conditional probability can be expressed as:

$$P(N|M) = \frac{P(N,M)}{P(M)} \tag{1}$$

In formula (1), P (N, M) represents the joint probability distribution of event M and random event N occurring at the same time. And the conditional probability P(N|M) is only meaningful when P(M) > 0, that is, the formula cannot calculate the conditional probability on the event that the given event will never happen. Assuming that there are now three random variables a, b and c, by using formula (1) twice, we can get:

$$\begin{cases} P(a,b,c) = P(a|b,c)P(b,c) \\ P(b,c) = P(b|c)P(c) \\ P(a,b,c) = P(a|b,c)P(b,c)P(c) \end{cases} \tag{2}$$

In the NLP research center, we often need to calculate the common probability distribution of multiple random variables. The types of the common probability x distribution of random variables can be summarized as follows:

$$\begin{gathered} P(m^{(1)},\ldots,m^{(x)}) = P(m^{(x-1)},\ldots,m^{(1)})P(m^{(1)},\ldots,m^{(x-1)}) \\ = P(m^{(x-1)}\big|m^{(x-2)}\ldots,m^{(1)})P(m^{(1)},\ldots,m^{(x-2)}) \\ = P(m^{(x)}\big|m^{(x-1)}\ldots,m^{(1)})P(m^{(x-1)}\big|m^{(x-2)}\ldots,m^{(1)})\ldots P(m^{(2)}\big|m^{(1)})P(m^{(1)}) \\ = P(m^{(1)})\prod_{o=2}^{x} P(m^{(o)}\big|m^{(1)},\ldots,m^{(o-1)}) \end{gathered} \tag{3}$$

In formula (3), $P(m^{(1)},\ldots,m^{(x)})$ represents the joint probability distribution of x random variables from $m^{(1)}$ to $m^{(x)}$, and this rule is called the chain rule of conditional probability. During an experiment, when P(A|B) is known, it is often necessary to calculate P(B|A). To determine the relationship between the two, it can be calculated using the Bayesian formula:

$$P(B_o|A) = \frac{P(B_o)P(A|B_o)}{\Sigma_{i=1}^{x} P(B_i)P(A|B_i)} \tag{4}$$

In formula (4), $\Sigma_{i=1}^{x} P(B_i)P(A|B_i) = P(A)$ is called the prior probability of event A, $B_1,\ldots,B_x$ is the complete event group of event B, and $P(B_i) > 0$.

2) Structured probability model: Supposing three random variables x, y and z, event x and event z are conditions independent of y. But event x will affect the value of event y, and event y will affect the value of event z. These three variables are now represented as a chain of probability distributions of

two variables:

$$P(x,y,z) = P(x)P(y|x)P(z|y) \quad (5)$$

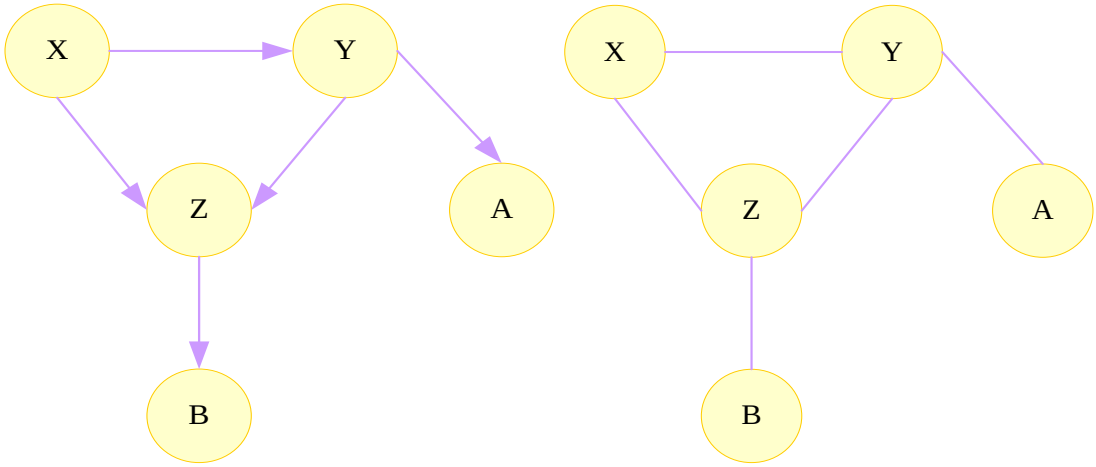
A directed graph model, also known as a Bayesian network, uses a directed arrow to connect two nodes, and the direction of the arrow represents a conditional probability distribution. This applies when the direction of information flow is relatively clear (Johannessen et al., 2017). In Figure 2(a), X points to Y and Z, indicating the probability that time X directly affects event Y and time Z. The probability distribution corresponding to Figure 2(a) is:

$$P(X,Y,Z,A,B) = P(X)P(Y|X)P(Z|X,Y)P(A|Y)P(B|Z) \quad (6)$$

The general formula for the probability distribution of a graphical model is:

$$P(m) = \prod_o^n P(m_o|Px_G(m_o)) \quad (7)$$

$m_1,\ldots,m_n$ represents a node in a directed graph. $Px_G(m_o)$ represents all parent nodes pointing to m_o nodes. Undirected graph models, also known as Markov random fields, use line segments without arrows to connect two nodes and do not represent conditional probabilities. Figure 2(b) below is an example of an undirected graph:



(a) directed graph. **(b)** undirected graph

Figure 2: Directed and undirected graphs

In an undirected graph, each node that satisfies the connection of two pairs of edges is called a clique, abbreviated as G, which represents the common probability distribution of all variables in G clique. To accomplish probability normalization, a normalization constant M must be inserted, which is defined as the sum of the products of the mean functions, namely:

$$P(x) = \frac{1}{m}\prod_{o}^{n}\theta^{(o)}\left(G^{(o)}\right) \quad (8)$$

In Figure 2(b), X, Y, and Z affect each other directly, but X and b only indirectly affect each other through Z, and the corresponding common probability types are:

$$P(X,Y,Z,A,B) = \frac{1}{m}\theta^{(1)}(X,Y,Z)\theta^{(2)}(Y,A)\theta^{(3)}(Z,B) \quad (9)$$

(4) Classifier model: 1) Support Vector Machine: SVM is a kind of supervised learning, and classifiers based on the principle of SVM are widely used in the field of text classification. The characteristic of the SVM classifier is to convert the low-dimensional nonlinear feature space into a high-dimensional linear feature space using a kernel function. In addition, the SVM classifier needs to maximize the hyperplane that divides the categories and is not sensitive to singular values (Alexopoulos et al., 2020). As shown in Figure 3, two different dots represent two different types, and the solid line $w^R x + v = 0$ in the figure is located in the middle of the two classification samples, separating the two types of samples. When the training set is noisy, the superclass to which the line belongs is less affected and produces classification results with the best robustness and the strongest generalization among the samples that do not appear.

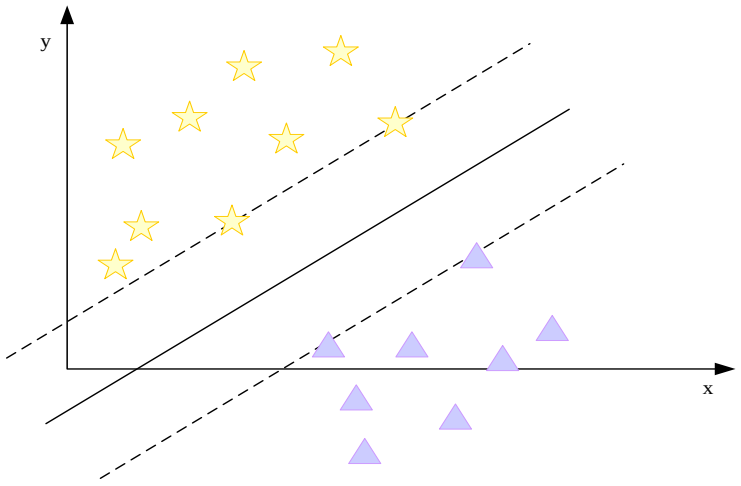


Figure 3: Schematic diagram of the support vector machine principle

In Figure 3, the super-level of classification is described by $w^R x + v = 0$. w is the normal vector, representing the direction of the hyperplane; v is the displacement, representing the distance between the hyperplane and the coordinate principle, and w^R is the displacement of the normal vector. Depending on the hyperplane type, the distance from any point x_a in the sampling space to the hyperplane can be expressed as:

$$s_a = \frac{|w^R x_a + v|}{\|w\|} \tag{10}$$

Let the given sample set be S, where any point (x_a, y_a) is an element in the sample set S, namely $(x_a, y_a) \in S$, $y_a \in \{+1, -1\}$, +1 and -1 represent two different categories respectively. If it is $y_a = 1$, that is, $w^R x_a + v > 0$, it means that (x_a, y_a) belongs to the category represented by the five-pointed star in Figure 3; if it is $y_a = -1$, that is, $w^R x_a + v < 0$, it means that (x_a, y_a) belongs to the category represented by the triangle in Figure 3. Combining these two formulas, we get:

$$\begin{cases} w^R x_a + v \geq 1, y_a = 1 \\ w^R x_a + v \leq 11, y_a = 11 \end{cases} \tag{11}$$

In Figure 3, two dashed lines represent the hyperplane where the two boundaries in formula (11) are located. The set of samples closest to the $w^R x + v = 0$ hyperplane can achieve the equal sign of formula (11), the dashed line where the support vectors in the figure lie. The distances of two different classes of support vectors to the hyperplane are defined as s_1 and s_2, respectively, to ensure that the hyperplane has the strongest robustness. It requires that the hyperplane satisfies $s_1 = s_2$, that is, the distance from the solid line to the two straight lines that are equal to the dashed line in the figure. The specific calculation formula is:

$$s_1 = s_2 = \frac{w^R(x_1 - x_2)}{2\|w\|} = \frac{1}{\|w\|}$$
$$whens = s_1 + s_2, thens = \frac{2}{\|w\|} \tag{12}$$

When s reaches the maximum value, the hyperplane is the dividing hyperplane with the "maximum interval". For the text classification model, the application scenario is multi-category classification, and the linear inseparability problem needs to be solved. At this time, the slack variable ϑ_a needs to be introduced to increase the fault tolerance rate of the classification model: increase the penalty factor D, and the size of the penalty factor determines the model's tolerance for outliers. Therefore, the optimal conditional expression is:

$$\begin{cases} \min\limits_{w,v,\vartheta_a} \frac{\|w\|^2}{2} + D\sum_{a=1}^{m} \vartheta_a \\ s.t.\, y_a(w^R x_a + v) \geq 1, a = 1,2,\ldots,m \\ \vartheta_a \geq 0, a = 1,2,\ldots,m \end{cases} \tag{13}$$

y_a represents the corresponding class label, s.t. represents the constraints, and $\|w\|^2$ represents the square of the norm of the normal vector. Using the Lagrangian multiplier method to construct the Lagrangian function for formula (13), we can obtain:

$$L(w,v,\mu,\vartheta,\sigma) = \frac{\|w\|^2}{2} + D\sum_{a=1}^{m}\vartheta_a - \sum_{a=1}^{m}\mu_a\left(y_a(w^R x_a + v) + \mu - 1\right) - \sum_{a=1}^{m}\sigma_a\vartheta_a \quad (14)$$

In formula (14), μ_a and ϑ_a are Lagrangian operators. Let the partial derivatives of $L(w,v,\mu,\vartheta,\sigma)$ with respect to w, v and ϑ_a be 0 to get:

$$\begin{cases} w = \sum_{a=1}^{m}\mu_a y_a x_a \\ 0 = \sum_{a=1}^{m}\mu_a y_a \\ D = \mu_a + \sigma_a \end{cases} \quad (15)$$

Substituting formula (15) into formula (14), the dual problem of formula (13) can be obtained as:

$$\begin{cases} \max\limits_{\mu} \sum_{a=1}^{m}\vartheta_a - \frac{1}{2}\sum_{a=1}^{m}\sum_{b=1}^{m}\mu_a\mu_b y_a y_b x_a^R x_b \\ s.t.\sum_{a=1}^{m}\mu_a y_a = 0, \mu_a \geq 0, a = 1,2,\ldots,m \end{cases} \quad (16)$$

Solving formula (15), the optimal solution of the classification function can be obtained as:

$$f(x) = \sum_{a,b=1}^{n}\mu_a y_a K(x_a, x_b) + v \quad (17)$$

$K(x_a, x_b)$ in formula (17) is called the kernel function, and the kernel function in this paper adopts the inner product kernel function, namely x_a^R, x_b. Support vector machine-based classification models use different forms of kernel functions to achieve better classification performance in nonlinear data.

2) Classification model based on convolutional neural network: CNN (Convolution neural network, convolutional neural network), is a kind of commonly used in the field of image classification. In recent years, this technique has been increasingly used in the field of text classification. Compared with using traditional machine learning for text classification, the text classification technology based on convolutional neural network can save the step of manually extracting feature words.

Convolutional neural network is a convolutional layer added on the basis of neural network. Like the traditional neural network, the convolutional neural network also consists of three parts, namely the input layer, the output layer and the hidden layer. Among them, the hidden layer can be divided into convolution layer, pooling layer and fully connected layer. It imports the data into the input layer, completes the feature extraction through the convolution layer and the pooling layer, and implements the text classification through the fully connected layer. Finally, the classification results are output through the output layer (Darin Mattsson et al., 2017; Shah et al., 2018). The specific structure of the convolutional neural network is shown in Figure 4:

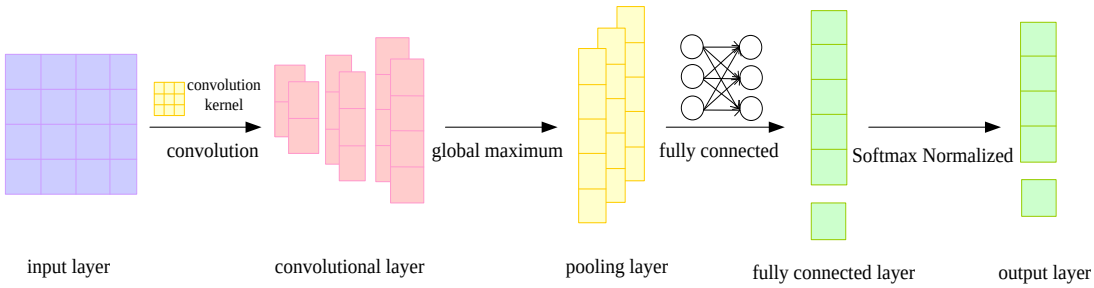


Figure 4: Classification model based on convolutional neural network

3.3 Services under the Integration of Sports and Medicine

It achieves the purpose of body sculpting by choosing an appropriate exercise program, and the purpose of fitness testing is to help people understand their physical condition. It provides the subjects with scientific methods and fitness principles to provide higher quality physical exercise. Physical fitness test can not only reflect the most basic physical condition of the human body, but also reflect whether a person's exercise method is appropriate. If the exercise effect is significant, the human body is in an unhealthy state, reminding people to eliminate various health threatening factors in time. Of course, the fitness test can also customize a workout formula for the controller, providing a set of fitness methods that are more beneficial to the body and mind. In order to help people choose the best exercise method and recommend appropriate attention to exercise for different physical conditions, they will form a complete scientific fitness curriculum (Ludwig et al., 2018). Through a series of tests of physical fitness testing, health intervention is carried out according to the test results. The specific process is shown in Figure 5:

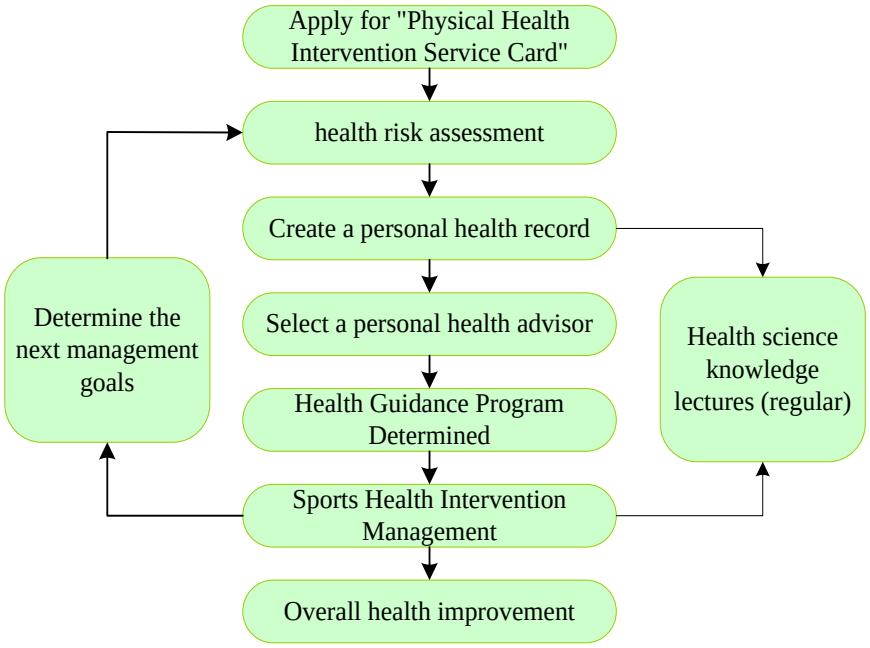


Figure 5: Physical Health Intervention Service

Through such individualized physical health interventions, it provides people with awareness of exercise and fitness. It advocates new concepts of health management and helps people invest in health scientifically and rationally. It enables healthy or sub-healthy people to have better health, promote health, and obtain a better quality of life (Baek & Hong, 2020). The overall function of the Center for Exercise and Health for the Elderly is shown in Figure 6:

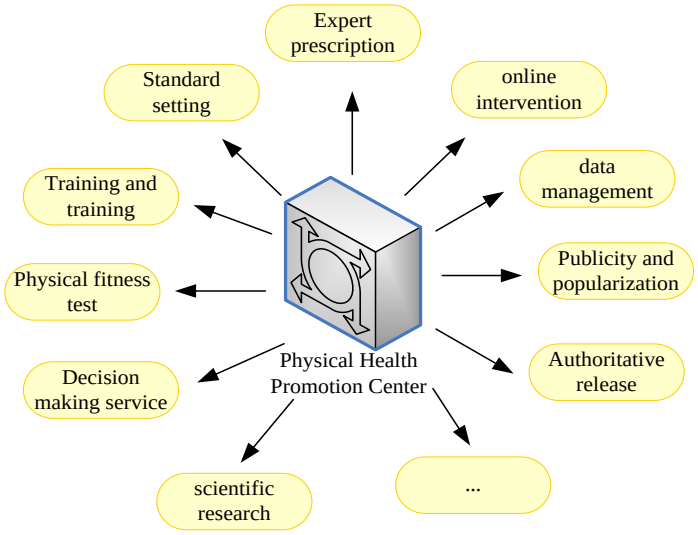


Figure 6: The overall functional structure of the center

Table 1 shows the overall functional classification and role of the Center for Exercise and Health for the Elderly:

Table 1: (a) Central functional structure role

	CLASSIFICATION	EFFECT
OVERALL FUNCTION OF THE CENTER	Physical Fitness Test	Further develop and improve the physical health promotion management organization network, and implement the physical health monitoring of the elderly;
	Online Intervention	Realize the interconnection between physical fitness test data collection and service background, and implement online intervention;
	Expert Prescription	Design personalized expert prescriptions to scientifically guide the steady improvement of the health of the elderly;
	Data Management	Manage the physical health data of the elderly and implement big data analysis;
	Publicity	Create a publicity platform and create a good atmosphere for the whole society to pay attention to the physical health of the elderly;
	Standard Setting	Formulate relevant management regulations and industry standards, and standardize testing procedures and methods;

Table 1: (b) Central functional structure role

	CLASSIFICATION	EFFECT
OVERALL FUNCTION OF THE CENTER	Training	Carry out training on physical fitness testing, develop health education courses, and promote the improvement of physical fitness testing work for the elderly;
	Authoritative Release	Grasp the first-hand information on the physical health status of the elderly and issue an authoritative physical health report;
	Decision Service	Predict and analyze the health status of the elderly, and provide decision-making services for government agencies, enterprises and institutions;
	Scientific Research	Carry out scientific research and project management on physical health promotion, and promote the transformation of industry-university-research results.

4. Experiment and Integration of Sports and Medicine to Promote Health of Elderly Services

4.1 Survey Methods

By studying the world's information on the integration of "physical medicine" and under the guidance of the tutor, this paper designed the "Questionnaire Survey on the Integration of Physical Medicine and Physical Medicine to Promote Elderly Health Services in the Background of Healthy China". The questionnaire takes elderly people over 60 years old in different regions as the research object. A total of 426 seniors were interviewed. During the period, 426 questionnaires were distributed and 418 questionnaires were returned. The recovery rate of the questionnaire was 98.12%. After recovery, the invalid questionnaires were checked and deleted, and the final number of valid questionnaires was 408. The effective rate of this questionnaire was 95.77%. Its basic composition is shown in Table 2.

Table 2: (a) Data analysis of respondents

CLASSIFICATION	SPECIFIC CLASSIFICATION	NUMBER OF PEOPLE (PEOPLE)	PROPORTION (%)
GENDER	Male	168	41.18
	Female	240	58.82
AGE	60-70 Years Old	277	67.89
	70-80 Years Old	114	27.94
	Over 80 Years Old	17	4.17
EDUCATION	Elementary School and Below	138	33.82
	Junior High School	146	35.78
	High School	68	16.67

Table 2: (b) Data analysis of respondents

CLASSIFICATION	SPECIFIC CLASSIFICATION	NUMBER OF PEOPLE (PEOPLE)	PROPORTION (%)
	Junior College	44	10.78
	Undergraduate	9	2.21
	Graduate and above	3	0.74
MONTHLY INCOME	Below 2500 Yuan	56	13.73
	2500-4000 Yuan	142	34.80
	4000-6000 Yuan	118	28.92
	More Than 6000 Yuan	92	22.55
SUFFER FROM CHRONIC DISEASE (MULTIPLE CHOICE)	Hypertension	240	58.82
	Diabetes	106	25.98
	Rheumatoid Arthritis	95	23.28
	Chronic Respiratory Disease	62	15.20
	Other	14	3.43
	Not Sick	60	14.71

The age of the respondents is mainly concentrated in 60-70 years old, and the education level is mainly in junior high school, primary school and below, which depends on the age level of the respondents. Due to the reasons of the times, their academic qualifications are generally not high. In terms of income, the income of the elderly in the survey sample is mainly concentrated in 2500–4000-yuan, accounting for 34.80%, followed by 4000–6000-yuan, accounting for 28.92%. Judging from the surveyed subjects suffering from hypertension, 240 people with hypertension ranked first, accounting for 58.82% of the total surveyed population. Followed by diabetes, chronic respiratory diseases, and chronic diseases, there were 106, 95 and 62 people respectively, indicating that the proportion of elderly people with chronic diseases is very high.

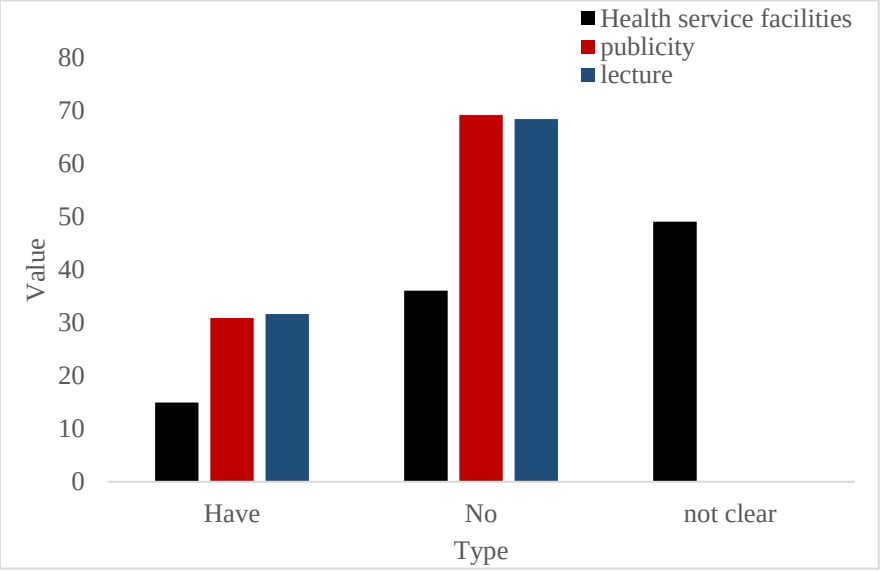
4.2 Status Quo and Problem

(1) Organization and publicity of the integration of sports and medical services: According to Figure 7(a), we can see that 49.02% of the people are not clear when asked whether the community has specialized medical and health service facilities that integrate physical and medical integration to promote the health of the elderly.

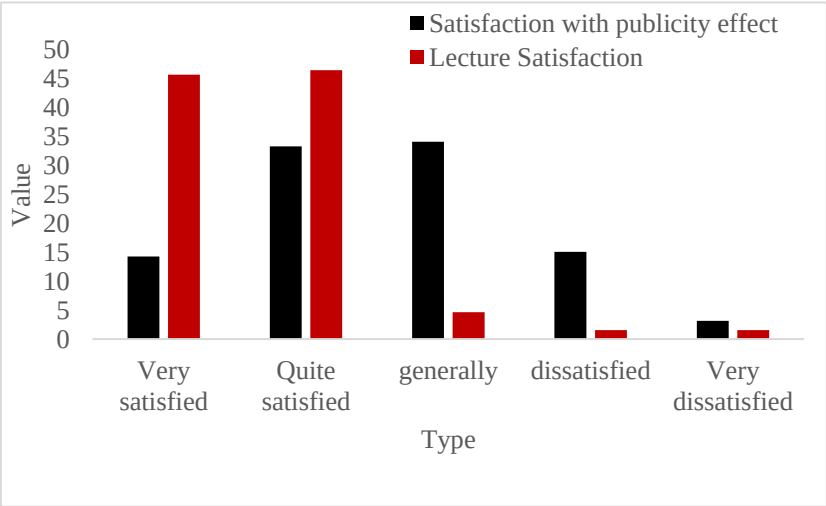
It shows that the publicity about the integration of sports and medicine to promote the health of the elderly is not in place. It is 36.03% who clearly know that the community does not have health service facilities that integrate sports and medicine to promote the health of the elderly. Only 14.95% of people

know that their community has medical and health facilities that integrate physical medicine to promote the health of the elderly. The role of propaganda in real life is very important. For the elderly, the channels for obtaining information are very limited, and it is far from enough to rely solely on TV or community health bulletin boards. Although it is common for the elderly to use mobile phones, they also have some difficulties in obtaining and reading some messages. When asked whether the elderly group had heard the propaganda of the integration of sports and medicine to promote health, only 30.88% said that they had heard of it, and most of the elderly (69.12%) had not heard the propaganda of the integration of sports and medicine to promote health. Therefore, the promotion of the integration of sports and medicine to promote elderly health services needs to be further strengthened.

According to Figure 7(b), it can be seen that 14.29% of the 126 people who have heard the promotion of health promotion through the integration of sports and medicine are very satisfied with the publicity effect, and 33.33% are relatively satisfied with the publicity effect. 34.13% were generally satisfied with the publicity effect, 15.08% were dissatisfied with the publicity effect, and 3.17% were very dissatisfied with the publicity effect. Therefore, from a comprehensive point of view, the promotion of health promotion through the integration of sports and medicine needs to be further improved. Regarding the satisfaction of the lectures on the integration of traditional Chinese medicine and medicine in the community to promote health, 45.74% of the 129 people were very satisfied with the lectures on the integration of sports and medicine to promote health. 46.51% were relatively satisfied with the lecture, 4.65% felt average, and 1.55% felt dissatisfied and very dissatisfied with the lecture. Therefore, most of the people who have listened to the lectures on the integration of sports and medicine to promote health are very satisfied.



(a) Investigation on health service facilities, publicity and lectures

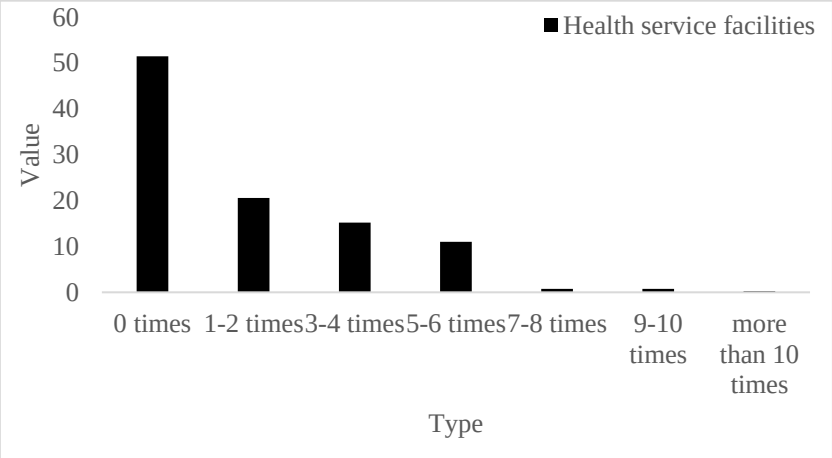


(b) Publicity effect and lecture satisfaction survey

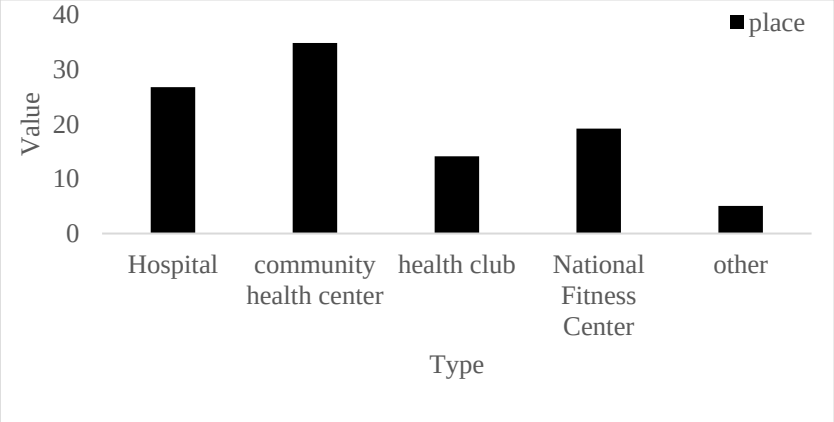
Figure 7: Organizational Publicity Survey of Integrated Sports and Medicine Services

(2) Status of receiving integrated services of sports and medicine: According to Figure 8(a), we can know that the proportion of people who have not received guidance on promoting health services through the integration of sports and medicine is as high as 51.47%. Those who have received 1-2 times of guidance on promoting health services through the integration of sports and medicine ranked second, accounting for 20.59%. 15.20% of the people have received 3-4 times of physical and medical integration to promote health service guidance, ranking third. 11.03% of the people have received 5-6 times of guidance on promoting health services through the integration of sports and medicine. The proportion of people who have received 7-8 times and 9-10 times of physical and medical integration to promote health service guidance is 0.74%, and only 0.25% have received 10 or more times. Therefore, on the whole, there are not many people who have received guidance on promoting health services through the integration of sports and medicine.

Among the 198 people who received the guidance of the integration of sports and medicine to promote health services, 34.85% of them received guidance services in community health centers, and 26.77% of them received guidance services for "integration of sports and medicine" to promote health in hospitals. 14.14% and 19.19% of the people received health promotion services in fitness clubs and national fitness centers, and 5.05% received guidance services in other places, as shown in Figure 8(b). It can be seen that community health centers and hospitals are concentrated places for the elderly to receive physical and medical integration guidance services, and national fitness centers and fitness clubs are now closely following the needs of the society to carry out corresponding services to meet the health needs of the majority of people.



(a) Frequency of elderly people receiving health-promoting services through the integration of sports and medicine



(b) Elderly people receiving physical and medical integration to promote health services

Figure 8: The situation of the elderly receiving health services through the integration of sports and medicine

(3) Service satisfaction: According to Table 3, among the 198 people who received the integration of sports and medicine to promote health services, 94 were very satisfied, and 139 were relatively satisfied. 9 people felt average, 2 people felt dissatisfied, and 1 person felt very dissatisfied.

Table 3: Satisfaction of the elderly receiving physical and medical integration to promote health services

OPTIONS	NUMBER OF PEOPLE (PERSON)	PROPORTION (%)
VERY SATISFIED	94	47.47
QUITE SATISFIED	92	46.46
GENERALLY	9	4.55
DISSATISFIED	2	1.01
VERY DISSATISFIED	1	0.51

(4) Demand for service content: The demand for the integration of sports and medicine to promote elderly health services is shown in Table 4. 58.09% of the people are in great need of the way of "physical medicine" integration to promote elderly health services, and 27.45% of the people need it. 11.76%, 1.96% and 0.73% of the number of people who need general, unneeded and completely unneeded health services for the elderly through the integration of "physical medicine". Therefore, in general, most of the elderly are in great need of "physical medicine" integration to promote elderly health services.

Table 4: Demands of the elderly to accept the content of health services through the integration of sports and medicine

OPTIONS	NUMBER OF PEOPLE (PERSON)	PROPORTION (%)
VERY NECESSARY	237	58.09
MORE NEEDED	112	27.45
GENERALLY	48	11.76
UNNECESSARY	8	1.96
NOT NEEDED AT ALL	3	0.73

(5) Analysis of main problems: According to expert interviews, the results of questionnaire surveys, and the results of field investigations, the main problems in promoting elderly health services through the integration of sports and medicine are as follows (as shown in Figure 9).

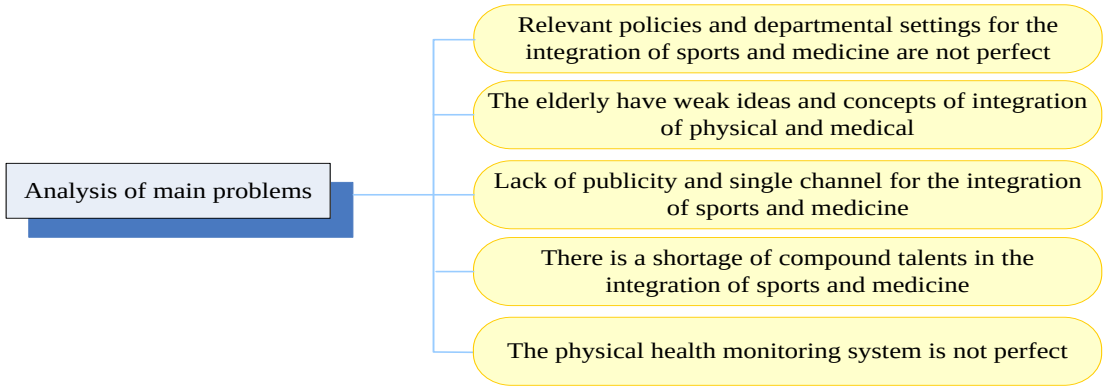
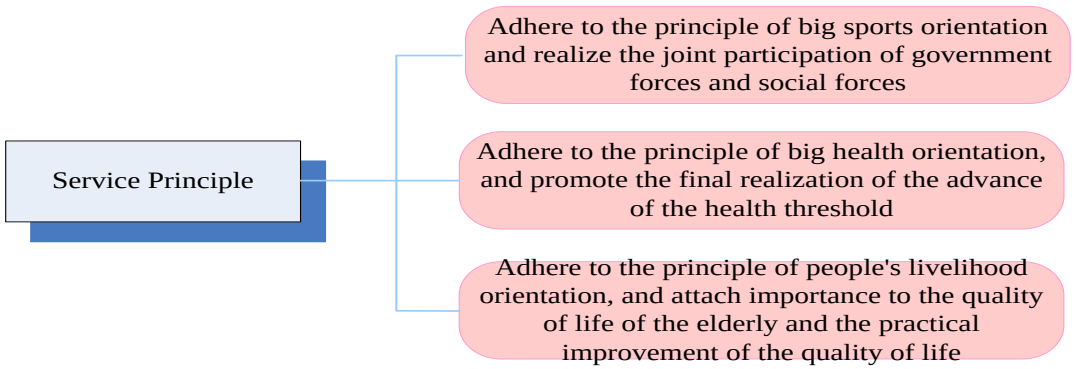


Figure 9: The main problems of the integration of sports and medicine to promote elderly health services

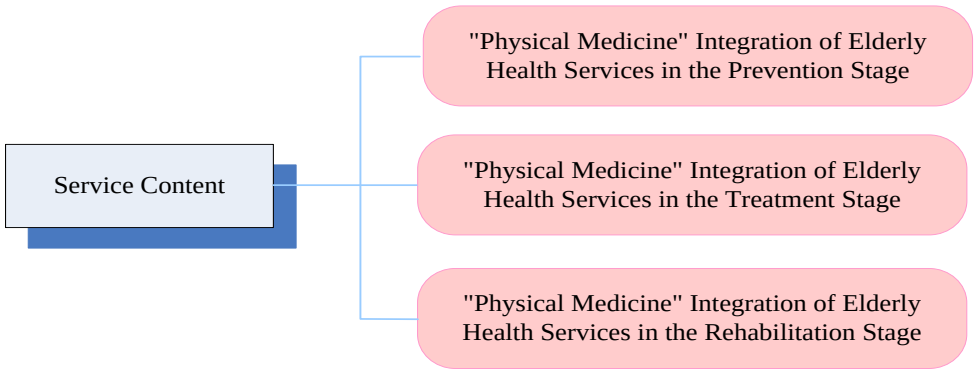
4.3 Implementation Path of Elderly Health Services under Integration of Sports and Medicine

Adhering to the principle of big sports orientation, and realizing the joint participation of government forces and social forces. Adhering to the principle of great health orientation, and promoting the final realization of the advance of the health threshold. Adhering to the principle of people's livelihood orientation and attaching importance to the quality of life of the elderly and the practical

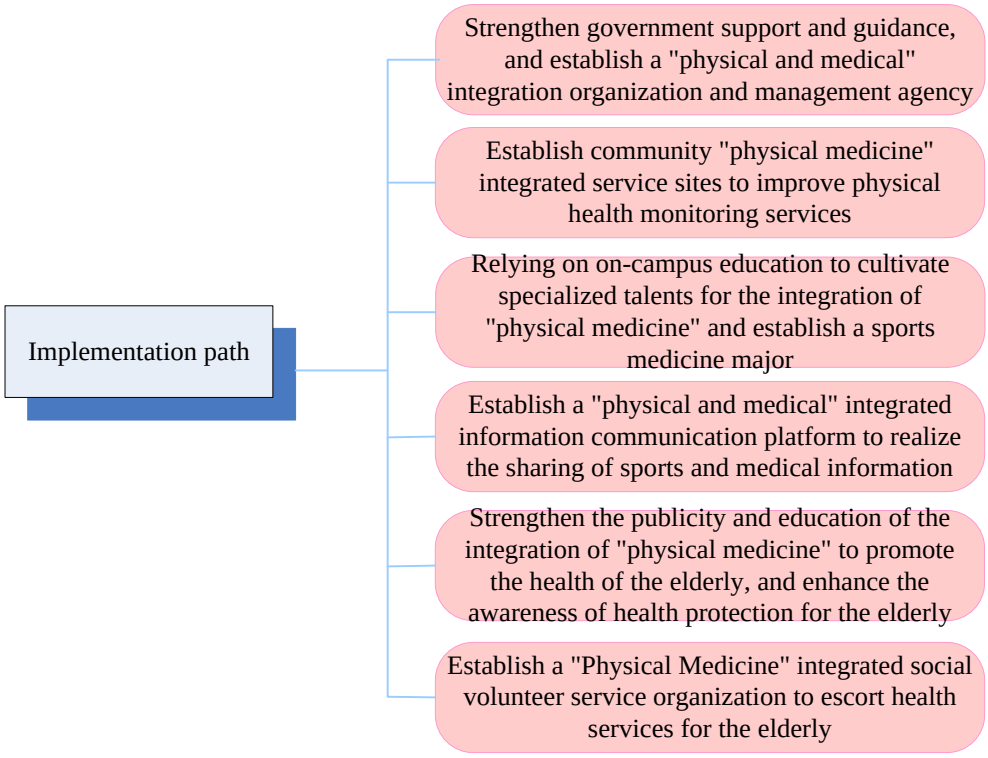
improvement of the quality of life are the three service principles (as shown in Figure 10(a)). The integration of physical and medical services in the prevention phase of elderly health services, the “physical and medical” integration of elderly health services in the treatment phase, and the integration of physical and medical services in the rehabilitation phase of elderly health services are the three major service contents (as shown in Figure 10(b)).It strengthens government support and guidance, and establishes a "physical and medical" integrated organization and management agency. It establishes a community-based physical-medicine integration service site and improves physical health monitoring services (promoting and establishing community "physical-medicine" integration service sites. For innovative testing projects, it provides personalized services). It relies on on-campus education to cultivate specialized talents for the integration of "physical medicine" and establish a sports medicine major. It establishes a "physical and medical" integrated information communication platform to realize the sharing of sports and medical information. It strengthens the publicity and education of the integration of "physical medicine" to promote the health of the elderly, and enhances the awareness of health protection for the elderly. It established a "physical medicine" integrated social volunteer service organization to escort the elderly health services (Heider et al., 2017). It is the implementation path of the elderly health service under the integration of six sports and medicine (as shown in Figure 10(c)).



(a) Service Principles



(b) Service Content



(c) Implementation path

Figure 10: The implementation path of elderly health services under the integration of sports and medicine

5. Discussion

This paper firstly analyzes how to conduct research on promoting the health of the elderly based on the background of healthy China and the integration of sports and medicine. This paper studies the concept of physical and medical integration, studies NLP, explores support vector machines, and analyzes the applicability of the research method in the promotion of elderly service health through physical and medical integration through experiments. According to information released by the National Bureau of Statistics, in 2015, the elderly population in China was 222 million, accounting for 16.1% of the total population. By 2050, China's population over the age of 60 will approach 450 million (Guzzo & Hayford, 2020). It shows that China has entered an aging society, and government agencies, community grassroots and individual families need more care for the middle-aged and elderly. It builds a living environment suitable for middle-aged and elderly people, and plans to develop non-profit sports projects. It strengthens the close connection between elderly care service equipment and community sports infrastructure functions to make it sustainable.

Through experimental analysis, this paper shows that: through the collection of health data of the elderly in the community, it can improve the

fitness service network of the elderly in the community. It realizes the complementarity and resource sharing of the two systems of sports and medical care. It strengthens the dissemination of health knowledge, establishes a basic information release system for health knowledge and skills, and widely publicizes the content of the integration of sports and medicine to promote the health of the elderly. It established a social volunteer service organization integrating sports and medicine to escort health services for the elderly.

6. Conclusion

In the new era, people's pursuit of health and quality of life is getting higher and higher. The current research on the integration of sports and medicine in China mostly focuses on policy analysis, concept discussion and experimental research on sports health promotion, and there are very few studies on the model of the integration of sports and medicine services. How to optimize the path of elderly health so that it serves the integration of sports and medicine, and promote the in-depth integration of the path of elderly health is an urgent issue under the current background of integration of sports and medicine. At present, the theoretical and practical research of the Chinese sports-medicine integration service model is still in the stage of exploration and pilot application, and there is no fixed standard for relevant research examples. Due to the limited theoretical level of the authors, the research framework may be flawed.

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