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Research Article

Optimal Allocation of Resources for the Integrated Medical Care and Elderly Care Model under Dynamic Monitoring

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Aiming at the problems of poor fairness of resource allocation and long time-consuming allocation of traditional methods, a method of resource optimization allocation under dynamic monitoring of medical care combined with elderly care mode is proposed. The integrated medical and elderly care model is analyzed, the role of dynamic monitoring in the optimal allocation of resources in the integrated medical and elderly care model is discussed, and a general model for optimal allocation of medical and elderly resources based on the analysis results is established. Based on the criterion of "minimum variance of estimation error," a combined prediction model is established to obtain the combined prediction results. The investment objects of the optimal allocation of resources in the elderly care model are clustered in advance by using the clustering method, and the investment objects of the optimal allocation of resources in the elderly care model are comprehensively evaluated by using the principal component analysis method. According to the actual results of the comprehensive evaluation, the improved whale algorithm is used to allocate pension resources reasonably, and the fairness and applicability of the allocation results are analyzed experimentally. The results show that the method proposed in this paper has strong rationality and can effectively realize the rational distribution of pensions.

1. Introduction

Pension is an issue widely concerned by the state and society. China's 13th five-year plan proposes further promoting the combination of medical and health care and pension services to meet the people's multilevel and diversified health and pension service needs [1–3]. The combined medical care and elderly care model is a new elderly care service model that conforms to the needs of the times, solves the dilemma of medical care and elderly care for the elderly, and integrates life service and rehabilitation health care [4, 5]. The combined medical care and elderly care model is an effective model to improve the medical treatment and elderly care of the elderly, and reasonable resource allocation is the key link of the efficient combination of "medical care" and "elderly care" [6, 7]. However, there is a serious imbalance between supply and demand and unequal distribution of resources. In order to give play to the greater benefits of the combination of "medical care" and "maintenance" and meet the elderly's pension needs, it is an urgent problem to allocate pension resources fairly, reasonably, and scientifically [8, 9].

In order to realize the effective allocation of pension resources, relevant experts and scholars have conducted a lot of research and achieved some remarkable research results. Reference [10] put forward the research on China's social pension expansion and medical utilization according to the new rural pension plan. Many countries have adopted social pension schemes to better meet the needs of older persons. A better understanding of the income health gradient may lead to more effective pension schemes and health policies. The purpose is to evaluate the impact of social pension expansion on medical utilization in China. Respondents in the 2013 National Longitudinal Study on health and retirement were retrospectively registered to assess the impact of pension registration on medical utilization using China's new rural pension plan (NRPS), the world's largest existing pension plan. Given that preventive care helps people stay healthy and receive timely treatment when necessary, it also helps to reduce overall medical costs. The results emphasize the promotion of public health by increasing the availability of economic resources and the far-reaching impact of China's social pension reform. Reference [11] put forward Korean medical expenditure and its determinants depending on public pension income and analyzed medical expenditure and its determinants by using Korean retirement and income data provided by the National Pension Institute. According to the data of the Korean retirement and income study from 2005 to 2013, the study was prepared by the National Pension Institute. t-test and analysis of variance were used to analyze the general characteristics and medical expenditure, and logistic regression was used to analyze the determinants of medical expenditure. Families without a public pension may spend more on medical expenses than those receiving a public pension. The results show that the quintile of total household expenditure has a fourfold impact on medical expenditure. In addition, poor health has a greater impact on medical expenditure than good health. The conclusion is that it is necessary to formulate a pension policy to ensure that retirees receive a reasonable amount of pension and provide health policies and financial support programs for medical services. Reference [12] used Theil index method and comprehensive evaluation method to analyze the balance and change of medical resource allocation in metropolitan areas of China, taking Shanghai as an example. From the overall allocation indicators, the number of medical institutions has increased significantly, and the improvement of resources such as beds and health care personnel is not obvious. From the vertical allocation indicators, although the medical resources at the hospital level and community level are increasing, the inverted triangle allocation pattern is more serious. The overall balance of hospital medical resource allocation is relatively poor, and the balance of community medical resource allocation is relatively good. However, due to the limited overall medical resources, community medical resources are still in a low level of balance. In view of the above problems, this method proposes to appropriately increase the supply of high-quality resources in terms of increment and make up for the shortcomings of health human resources. In terms of stock, the tilt at the grassroots level should be increased and the rational flow of medical and health resources from the central urban area to the suburbs should be promoted. At the mechanism level, smart medical and other technical means should be made full use of to promote the efficient utilization of medical resources across regions, levels, institutions, and time.

Although the above methods put forward corresponding resource allocation approaches and methods for practical problems, there is still some room for improvement in the fairness and time consumption of pension resource allocation. Therefore, in order to realize the optimal allocation of pension mode resources, this paper puts forward the optimal allocation method of medical care combined with pension mode resources under dynamic monitoring.

2. Analysis of the Optimization of Resource Allocation in the Model of Combining Medical Care and Elderly Care for the Elderly

2.1. Analysis of the Model of Combining Medical Care and Elderly Care for the Elderly. According to the current medical development level and pension model in China, the two can be effectively combined, the traditional pension structure will be innovated, the medical pension care model will be formed, medical resources will be fully applied to the pension model, and resources will be effectively combined to achieve the goal of the pension model. Optimize and upgrade to improve the living standards and quality of life for the elderly. The combination of medical care and elderly care is the innovation of elderly care concept and the transformation of elderly care thinking based on the traditional concept of elderly care. On the one hand, the elderly's pursuit of longevity and improving the quality of life has improved their awareness of independent elderly care. They have new needs for all levels of elderly care services, and medical care services have become the core needs. On the other hand, with the high-level development of China's domestic economy, the utilization of resources has gradually enriched. The publicity of social media and the development of pension industry promote the socialized transformation of the elderly's pension consciousness. There is an urgent need for the organic integration of medical and pension resources to meet their needs of socialized pension. It can be concluded that the current mode of combining medical care and pensions is in line with the development trend of population aging and is the inevitable choice to realize the Chinese dream of "having medical care and old-age care for the elderly."

The combination of medical care and maintenance should be realized in diversified forms. At present, in order to improve China's elderly care capacity, there is a situation of blindly increasing the number of elderly care institutions. This approach is unreasonable and cannot effectively improve China's elderly care level. Under the construction of a model that combines medical care and elderly care, it is necessary to give full play to the hospital's nursing advantages and to penetrate the medical care concept into the hearts of the elderly. Transform and upgrade the old-age care model, add new home-based and community-based old-age care methods, rationally and effectively integrate medical resources, improve comprehensive service levels, and achieve comprehensive coverage of medical care.

2.2. The Role of Dynamic Monitoring in the Optimal Allocation of Resources for the Integrated Medical Care and Elderly Care Model. At present, in the resource allocation of pension mode, in addition to a small amount of data visualization means, more statistical analysis is carried out through staff resource data. However, staff analysis will make the relationship between data unclear. The lag of data expression leads to human-computer interaction becoming a weak link in the resource allocation of the current pension model.

After receiving the information, the staff can get the cognitive information through brain analysis and processing. This analysis and processing process (as shown in Figure 1) is an in-depth information mining process, which needs to be completed by dispatching the staff to pay mental labor.

When more and more data is read, the staff must create a data model in the brain to organize the read data. When the data model becomes more and more perfect, the staff can get high-level information by analyzing the data model. If the amount of data collected is small, it will be very easy to obtain relevant data through the staff information analysis model in Figure 1. However, if the data collection rate becomes faster and the amount of data becomes larger, the data processing will become complex, and frequent mental work is easy to make the staff tired, so as to increase the possibility of errors.

In order to liberate the staff from the above frequent mental work, the existing resource supervision mode of medical care combined with elderly care must be reformed. Data centralized dynamic monitoring can free staff from complex information mining. Dynamic monitoring can display the visualized model on the monitoring screen and can monitor all links of resource allocation in real time, so that the staff can understand the resource allocation status by identifying different modes. After the centralized monitoring and processing of resource information of medical care combined with elderly care mode, the improvement diagram of staff information analysis model is shown in Figure 2.

In the model shown in Figure 2, a monitoring data visualization process is added to display data visualization graphics. Staff can directly get the information of each link of resource allocation of pension mode. The centralized display of data visualization processing and monitoring data reduces the process of data item identification, data organization model establishment, and maintenance, shortens the time of information acquisition, and reduces the mental workload of staff. The visual processing in the dynamic monitoring process of the optimal allocation of resources in the elderly care model will increase the information processing capacity of the computer, but it can free the staff from the original frequent and heavy mental work and reduce the possibility of mistakes due to fatigue.

2.3. The General Model of Resource Optimization Allocation in the Integrated Medical Care and Elderly Care Model. The ultimate goal of the resource allocation of the pension model is to meet the pension needs of the elderly population. How can the provider of pension resources use effective supply to meet the pension needs of the elderly population at different levels of society and achieve the goal of "the elderly have a sense of security, a sense of medical care, a sense of action, a sense of learning, and a sense of happiness" put forward in the law on the protection of the rights and interests of the elderly? In this way, social welfare can be maximized, which is also the main basis for the establishment of the resource optimal allocation model of comprehensive medical and old-age care model under dynamic monitoring proposed in this paper. There is an interaction among the three elements. Dynamic factors affect the supply and demand of elderly care resources. The demand of elderly care resources is ahead and the supply of elderly care resources is lagging. Under the action of motivation, the supply of elderly care resources must take the elderly care demand as the premise to truly realize the high efficiency of the allocation of elderly care resources [13]. Figure 3 shows a schematic diagram of a general model for the optimal allocation of resources in the mode of combining medical care with elderly care.

According to Figure 3, in the model, set a represents the pension resources that the elderly population wants to obtain, that is, the pension needs, but they are not the actual pension needs, which can be called pension preference. The supply subject does not provide such pension needs, and the pension environment does not support such pension resource needs, because the economic needs of the elderly can effectively reflect the current state of the country's protection for the elderly and at the same time can fully reflect the elderly's willingness to pay and their limited ability to pay, which leads to the living conditions of the elderly in their later years.

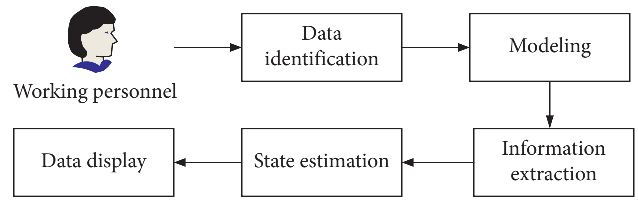

FIGURE 1: Information analysis model in the brains of workers.

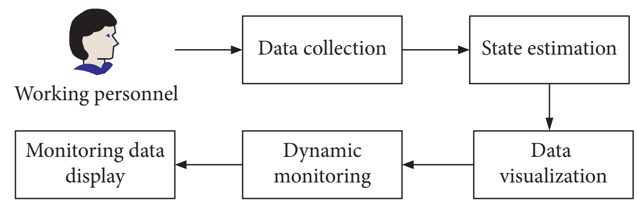

FIGURE 2: Optimization of staff information analysis model.

3. Realization of Optimal Allocation of Resources for the Integrated Medical Care and Elderly Care Model under Dynamic Monitoring

Utilizing the constructed model of combining medical care and elderly care, the optimal allocation of resources in the mode of combination of medical care and elderly care under dynamic monitoring is further completed through the steps

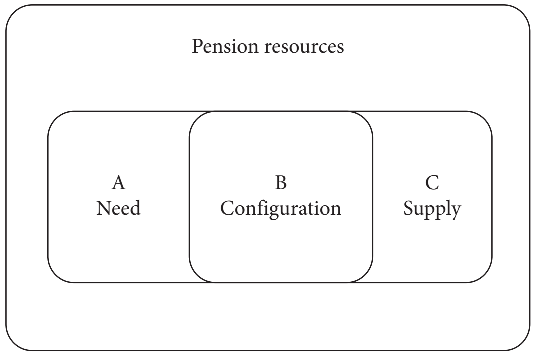

Figure 3: The general model of resource optimization allocation in the integrated medical care and elderly care model.

of resource demand prediction, investment evaluation of resource allocation, optimal allocation of resources, and reliability evaluation of resource allocation.

3.1. Establishment of a Combination Forecasting Model of Resource Demand for the Elderly Care Model. Based on a certain community endowment mode as an example to establish nursing personnel demand forecasting model, to observe the time series of demand for elderly care personnel, the time series prediction can be used twice in exponential smoothing model and gray system model to predict, but because of the limitations of single forecasting model, this paper selected the principle of "minimal variance estimation error" for the combination forecast model set up [14].

Assuming that a set of predicted data is S_d, where $d = 1, 2, \ldots, n$, the predicted value obtained by the existing N single prediction model is $K_{i\,d}$, where $i = 1, 2, \ldots, m$, and the weighting coefficient is $\delta = (\delta_1, \delta_2, \ldots, \delta_m)^2$; then the combined prediction formula is

$$\widehat{K} = \sum_{i=1}^{n} K_{i\,d} \times \delta. \tag{1}$$

It can be seen from the model that the key to combined prediction is to determine the weighting coefficient δ.

This article first selects the quadratic exponential smoothing model and the gray system model to make predictions separately and then combines the individual models with the criterion of "the variance of the estimation error is minimal"; then the prediction model is

$$\widehat{K}' = \delta x_1 (1 - \theta) x_2. \tag{2}$$

Here, x_1 represents the error variance; x_2 represents the estimator; θ represents the mean value of the deviation, and its calculation formula is

$$\theta = \frac{\operatorname{cov}(y_1, y_2) - \operatorname{var}(y_1)}{\widehat{K} - \widehat{K}\prime}. \tag{3}$$

Here, y_1 represents the error of the quadratic exponential smoothing prediction model; y_2 represents the error of the gray system prediction model; var represents the variance; cov represents the covariance.

Inventory demand forecasting can be forecasted by a number of different models. In the final selection of the most suitable model, this paper uses the principle of accuracy first as the model evaluation standard [15].

The principle of accuracy priority is that when the forecast model is used for inventory demand forecasting, the result of the forecast during the forecast period is smaller than the actual value, and the accuracy is higher. This paper chooses the mean square error (MSE) as the indicator to measure [16]:

$$\text{MSE} = \frac{\sum_{i=1}^{n} (A_i - B_i)^2}{M}. \tag{4}$$

Here, A_i represents the actual value; B_i represents the predicted value; M represents the number of samples.

The accuracy of the model can be found by calculating the mean square error. The smaller the value, the higher the accuracy of the model solution. In the optimal allocation of resources for the elderly care model, it is necessary to predict not only the demand for disposable masks but also the number of beds, fitness equipment, injection instruments, and other resources. In the prediction of the demand for a variety of resources, the above prediction methods can be used to obtain the combined prediction results.

3.2. Evaluation of Investment Funds in the Optimal Allocation of Resources for the Elderly Care Model. Clustering method and principal component analysis method are used to comprehensively consider the investment of pension mode resource optimization allocation before optimal allocation. Among them, clustering method is used to cluster the investment objects of optimal allocation of endowment model resources in advance [17]. The clustering method mainly uses mathematical methods to quantitatively determine the closeness relationship between the samples of the research objects, cluster the samples with similar features and small comprehensive differences, and classify the samples with large similar features and large comprehensive differences. In order to reduce the complexity of the optimal allocation of pension mode resources and reduce the allocation time, this paper mainly clusters the pension mode resources [18]. The specific clustering process is as follows:

(1) Firstly, the initial aggregation point of resource clustering of pension model is selected; that is, one aggregation point is selected for each category.

(2) Gather the resources closest to the gathering point first, and then calculate the average value of each type of resources to make a new gathering point. Its expression is as follows:

$$\partial_{ij} = \left(\mu_j^t - \mu_j^t\right)\text{rand}\left(z_{ij}\right). \tag{5}$$

Here, μ_j^t and μ_j^t represent the first two aggregation points, respectively; z_{ij} represents the new aggregation point after clustering.

(3) Calculate the maximum value of the change between the initial aggregation point and the new aggregation

point. When the minimum value of the change does not reach the maximum number of iterations, repeat Step 2 and modify the aggregation point at the same time until the conditions are met and stop clustering. At this time, the generated aggregation point is taken as the final aggregation point.

(4) All samples are assigned to the category nearest to the cluster center to complete the resource clustering of pension mode.

On the basis of completing the clustering of pension model resources, the principal component analysis is used to comprehensively evaluate the investment objects for the optimal allocation of pension model resources [19], which mainly converts multiple indicators into a small number of indicators or multiple indicators into one or more comprehensive indicators by studying the internal structural relationship of the index system. Among them, the specific indicators include the original data information on the allocation of resources for the elderly. Research on the original data indicators by principal component analysis is simplified, and reasonable resource allocation variables are obtained [20]. The specific steps of comprehensively evaluating the investment object of the optimal allocation of resources in the elderly care model through the principal component analysis method are as follows:

(1) Collect the original data matrix of the funding objects for the optimal allocation of resources in the pension model. Assuming that there are L sample objects, each sample object contains l evaluation indicators, and the original data matrix is obtained:

$$L = \begin{bmatrix} l_{11} & l_{12} & \cdots & l_{1n} \\ l_{21} & l_{22} & \cdots & l_{2n} \\ \cdots & \cdots & \cdots & \cdots \\ l_{n1} & l_{n2} & \cdots & l_{nm} \end{bmatrix}. \tag{6}$$

(2) Standardization processing. Standard processing refers to the transformation of different indicators in different dimensions. In the case of simple addition, the influence of different dimensions of the indicators is eliminated, so that variables that cannot be directly added can be added. The expression is

$$\chi_L = \left[\left(\chi - \chi_{\min}\right) + \left(\chi_{\max} - \chi_{\min}\right)\right]. \tag{7}$$

Here, $\chi_{\max}$ and $\chi_{\min}$, respectively, represent the maximum and minimum values of the investment object; χ represents the total investment.

(3) Further solve the eigenvalues of the correlation matrix of standardized data, and the expression is

$$L_w = \frac{W}{2\sqrt{r_i}} \times \varpi_i. \tag{8}$$

Here, r_i represents the characteristic value; W represents the variance contribution rate; ϖ_i represents the characteristic parameter of the data.

(4) By calculating the comprehensive score, the comprehensive evaluation index function of the input object for the optimal allocation of resources in the pension model is obtained:

$$D_{ij} = \sum_{i=1}^{m} \sum_{j=1}^{n} \left[J_{ij} - \frac{1}{N}\right]^2. \tag{9}$$

Here, D_{ij} represents the ratio of the principal component to the total variance; J_{ij} represents the load corresponding to the principal component.

Through the above calculations, the clustering of the resources of the pension model is realized, and the comprehensive evaluation of the funding objects for the resource allocation of the pension model is completed.

3.3. Optimal Allocation of Resources for the Integrated Medical Care and Elderly Care Model Based on the Whale Optimization Algorithm. The improved whale algorithm can effectively obtain the optimal resource allocation ratio for the combination of medical care and pension mode. First, it is necessary to set the configuration variable parameters of the model, taking the numbers of elderly people in different regions as variables. Then initialize the whale population and randomly generate a whale. The spatial position of each individual in the whale population represents a set of decision variables. The spatial position of each individual whale is determined by the objective function, and the spatial position of the current individual whale is continuously updated by using the different forms of foraging strategies of the whale group. In this way, obtain the optimal solution for resource allocation through iterative calculation [21]. The specific solution steps are as follows:

Step 1: randomly generate the initial whale population according to the constraints, take the randomly generated P whales as the initial whale population, and take the spatial position of individual whales as the decision variable in the optimal allocation problem (in this paper, the resources allocated to each elderly in each region are taken as the decision variable). The position of the a whale in the d -dimensional space can be expressed as

$$Q_a = \left(q_a^1, q_a^2, \ldots, q_a^d\right), \quad a = 1, 2, \ldots. \tag{10}$$

Step 2: obtain the objective function in the configuration model. Take a region as an example: the two objective functions of optimal economic benefit and optimal social benefit adopt the weighting method (in which the economic benefit weight is 0.4 and the social benefit weight is 0.6). After converting the multi-objective problem into a single objective, calculate the fitness value of each individual in the whale population, and find and save the best whale individual $\overline{Q}_d$ in the current population (the current optimal solution) [22].

Step 3: update the position of the whale group according to the different values of the parameters. When $T < T_{\max}$, each iteration will update the parameters of each individual whale group: O and H.

The specific update situation of the whale group position is as follows: (1) When $O < 0.5$ and $|H| < 1$, update the current individual whale position. (2) When $|H| \geq 1$, select a random individual whale $\overline{Q}_{\text{rand}}$ and update the position of the current individual whale. (3) When $O \geq 0.5$, update the position of the current individual whale.

Step 4: check whether the updated position of any individual whale exceeds the search space (constraint conditions), and correct the position of the whale that exceeds the search space.

Step 5: calculate the fitness value of each individual whale group after the update through the objective function, find and save the best individual whale $\overline{Q}_d$ in the group, and judge whether the algorithm meets the optimal solution of the objective function. If it is satisfied, the spatial position $\overline{Q}_d$ of the optimal individual whale and its corresponding fitness value are output, and $\overline{Q}_d$ is the optimal solution of the optimal configuration problem; if it is not satisfied, let $T = T + 1$ and return to Step 3 for reiteration [23].

3.4. Reliability Evaluation of Resource Optimization Allocation in the Model of Combining Medical Care and Elderly Care for the Elderly. In order to improve the reliability of resource allocation of the medical-care-integrated elderly-care model, the results of its allocation are evaluated [24, 25]. Let C represent the total number of reliability evaluation indicators for the optimal allocation of resources in the medical care and elderly care model. The evaluation set $C = \{c_1, c_2, \ldots, c_n\}$ is composed of c evaluation indicators, where c_i represents the indicator value, which is a nonnegative integer. The reliability evaluation index is standardized by the following formula [26, 27]:

$$F_c = \frac{C}{c_{\max}(i) + c_{\min}(i)}. \quad (11)$$

Here, $c_{\max}(i)$ represents the maximum value corresponding to the reliability evaluation index; $c_{\min}(i)$ represents the minimum value corresponding to the reliability evaluation index.

According to the obtained evaluation index value F_c, the fuzzy evaluation matrix ψ of the reliability evaluation index of the resource optimization allocation of the medical-care-integrated elderly-care model is constructed [28–30], and its expression is as follows:

$$\psi = C_{n\times m}. \quad (12)$$

Let c_k represent the standard deviation corresponding to the evaluation index, and its function is to reflect the degree of the comprehensive evaluation result affected by the reliability evaluation index [31, 32], and its calculation formula is as follows:

$$c_k = \frac{1}{\varphi}\left[\phi\left(1 - \varphi^2\right) \times \psi\right]. \quad (13)$$

Here, φ represents the weight of the evaluation index; ϕ represents the average value of each reliability evaluation index, and the calculation formula is as follows:

$$\phi = \left|\frac{N_t}{1 - \varphi\left(F_t + G_t\right)}\right|. \quad (14)$$

Here, F_t represents the weight coefficient matrix of each evaluation index; G_t represents the comprehensive weight coefficient matrix; N_t represents the optimal value of the standard deviation of the evaluation index, and the judgment matrix V_{ij} is constructed according to N_t [33]:

$$V_{ij} = \begin{cases} \dfrac{F_{\max} - F_{\min}}{1 - \varphi F_t}, \\ \\ \dfrac{\sqrt{1 - \varphi^2}\, F_t}{1 - \varphi F_t}. \end{cases} \quad (15)$$

Here, $F_{\min}$ represents the minimum value in the standard deviation set; $F_{\max}$ represents the maximum value in the standard deviation set.

Use the judgment matrix V_{ij} to calculate the weight of each reliability evaluation index [34]:

$$V_h = \left\{V_{ij}\right\}_{n\times n}. \quad (16)$$

Use the judgment matrix V_{ij} to calculate the membership value corresponding to each reliability evaluation index:

$$V_f = \frac{F_t}{\sqrt{\alpha}\left(1 - \varphi_t F\right)} \times V_h. \quad (17)$$

According to the membership value V_f and weight V_h corresponding to the reliability evaluation index, the reliability evaluation of resource optimization configuration of the medical-care-integrated and elderly-care model is constructed [35, 36]:

$$E = V_h + \phi\sqrt{1 - \varphi^2} F_t \times V_f. \quad (18)$$

Formula (18) is used to calculate the reliability evaluation value of optimal allocation of resources in the mode of combining medical care and elderly care. The evaluation results are taken in the interval [0, 100]. The higher the score, the higher the reliability of the optimal allocation of resources in the combination of medical care and elderly care model.

4. Experimental Verification Analysis

Through the above, the design of the optimal allocation method of medical care combined with elderly care model resources under dynamic monitoring is realized. In order to verify its effectiveness, the experimental design will be carried out next.

4.1. Experimental Data Extraction. In the experiment, an area was selected as the study area, and the proportion of the elderly population in the area from 2017 to 2020 was obtained through the data published by the government, as shown in Figure 4.

According to the results of the proportion of elderly population shown in Figure 4, the design method in this paper, tangible resource allocation and operation methods of elderly care institutions in eastern, central, and western China, and resource allocation optimization method based on HRAD and DEA are used to study and analyze the actual resource allocation and management methods of regional pension institutions. The experimental results are obtained and analyzed in detail, and relevant conclusions are drawn. In the experiment, SPSS 22.0 software is used to statistically analyze the experimental data to ensure the accuracy of the experimental results.

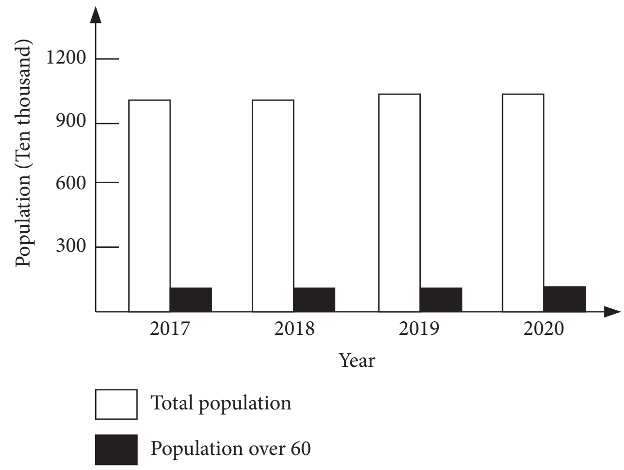

Figure 4: The proportion of the elderly population in the study area from 2017 to 2020.

4.2. Evaluation Index. Gini coefficient and Theil index are used to analyze the fairness of resource allocation of different methods. In addition, in order to verify the effectiveness of this method, the time consumption of resource allocation is used as an experimental index to compare and analyze different methods.

4.2.1. Gini Coefficient. Gini coefficient is a curve used to reflect the fairness of income distribution in economics. Resources are divided into several levels according to population or region and accumulated from small to large according to percentage. The value range is [0, 1], and the smaller the value, the fairer the resource allocation. On the contrary, when the resource allocation is more concentrated, Gini coefficient is in the best state below 0.3, 0.3~0.4 is relatively fair, 0.4 is the warning value, and above 0.6 is highly unfair.

4.2.2. Theil Index. According to the decomposition principle of Theil index, the smaller the Theil index, the better the fairness; on the contrary, the bigger the Theil index, the worse the fairness. The rationality of resource allocation can be effectively obtained through Theil index, which is complementary to Gini coefficient.

4.2.3. Time-Consuming Resource Allocation. The time consumption of resource allocation directly reflects the efficiency of resource allocation. The shorter the time consumption, the higher the allocation efficiency. The longer the time consumption, the lower the allocation efficiency.

4.3. Experimental Results and Analysis.

(1) Analyze the fairness of resource allocation for the aged in the experimental area based on the Gini coefficient

Figure 5 shows the comparison results of Gini coefficients of different methods.

By analyzing the data in Figure 5, it can be seen that, under different iteration times, the Gini coefficient of this method is between 0.1 and 0.3, while the highest Gini coefficient of tangible resource allocation and operation method of elderly care institutions in eastern, central, and western China is 0.5, and the highest Gini coefficient of regional health resource allocation optimization method in Guangdong province before and after the new medical reform based on HRAD and DEA is 0.6. It is shown that the equity of resource allocation of the pension model of this method is better than the traditional method. It has advantages in the fair distribution of resources such as institutions, beds, and fixed subsidies.

(2) Analyze the fairness of pension resource allocation in experimental areas based on Theil index

Taking beds, fixed subsidies, medical staff, and business area as measurement indicators, compare the fairness of resource allocation. Table 1 shows the calculation results of Theil index of this method.

According to Table 1, the experimental area is divided into two groups: central urban area and suburban county. Among them, the contribution rate of medical staff and fixed subsidies is greater than that in the region, the contribution rate of other elderly care resources is greater than that in the region, and the maximum Theil index of medical care in the region is 0.0570. It is shown that the biggest reason affecting the fairness of resources among regions is the allocation of medical resources.

(3) Resource allocation time/s

In order to prove the practicality of the design method in this paper, time consumption is taken as the experimental index to conduct comparative analysis with the above three methods. The experimental results are shown in Figure 6.

By analyzing Figure 6, it can be seen that the allocation time is always less than 2 s when using this method to

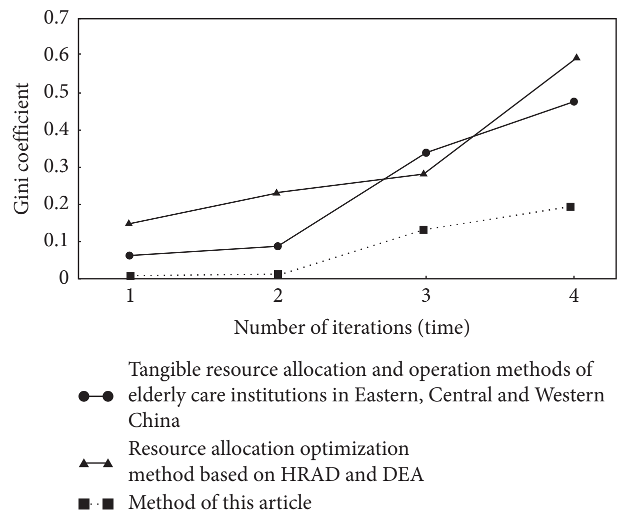

Figure 5: Comparison of Gini coefficients of different methods.

Table 1: The Theil index of the method in this paper.

Project	Bed	Fixed subsidy	Medical personnel	Business area
Within the area	0.0251	0.0012	0.0349	0.0280
Interarea	0.0024	0.0045	0.0570	0.0004

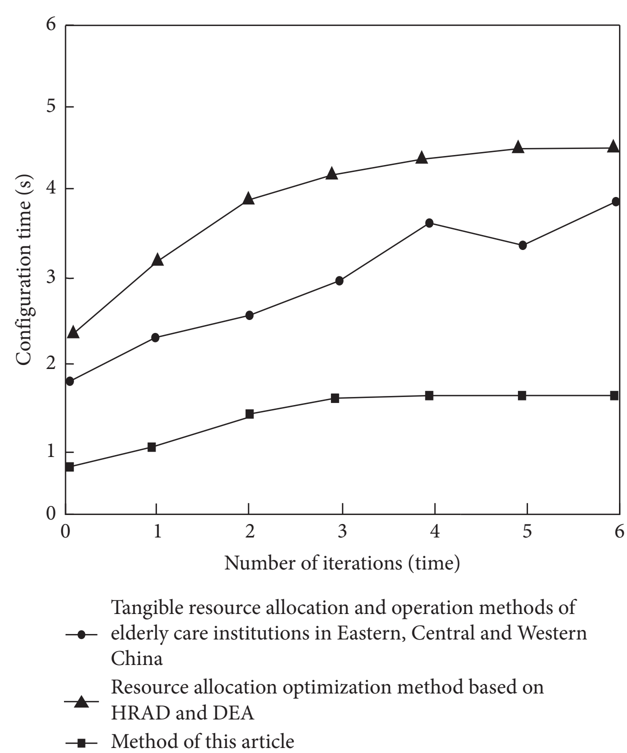

Figure 6: Comparison of time consumption of different methods of resource allocation.

allocate the resources of the elderly care model, and the resource allocation time of this method does not show a significant increase with the increase of the number of iterations. In contrast, before and after the new medical reform based on HRAD and DEA, the optimization method of regional health resource allocation in Guangdong province and the resource allocation of tangible resource allocation and operation method of elderly care institutions in eastern, central, and western China are time-consuming. Therefore, it can be concluded that the allocation efficiency and practical value of this method are higher.

To sum up, the designed resource optimization allocation method for the combination of medical care and elderly care model under dynamic monitoring has relatively fair configuration results, with Gini coefficients between 0.1 and 0.3. Moreover, the configuration efficiency of this method is high, and the configuration time is always less than 2 s.

5. Conclusion

In order to solve the problems of poor fairness and long time-consuming allocation of resources in traditional methods, a resource optimal allocation method of medical care combined with elderly care model under dynamic monitoring is proposed. The main innovations of this method are as follows:

(1) Based on the criterion of "minimum variance of estimation error," a combined prediction model is established to predict the number of hospital beds, fitness equipment, injection equipment, and other resources and obtain the combined prediction results

(2) The clustering method is used to cluster the investment objects of the optimal allocation of pension mode resources, and the principal component analysis method is used to comprehensively evaluate the investment objects of the optimal allocation of pension mode resources

(3) According to the evaluation results, whale optimization algorithm is used to optimize the allocation of pension mode resources

The experimental results show that the configuration results of this method are fair, the Gini coefficients are between 0.1 and 0.3, the configuration efficiency is high, and the configuration time is always less than 2 s.

Data Availability

The raw data supporting the conclusions of this article will be made available by the authors upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest regarding this work.

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