ingegneria sismica
International Journal of Earthquake Engineering
Anno XLIII - Num. 1 - 2026

Optimization Path of Public Hospital Medical Staff Salary Distribution Mode under the Orientation of Performance Appraisal

Xu Chen[1,*]

[1] Beijing Liangxiang Hospital, Beijing, 102400, China

SUMMARY: *Salary distribution plays a core role in workforce administration in public hospitals, which also serves as a key factor that affects the performance of medical staff and realizes their own value. In this paper, we designed a salary distribution scheme based on RBRVS method, selected nursing staff of a top-tier general hospital in province A as the survey object, collected data by distributing and recovering questionnaires, and the questionnaires underwent reliability and validity verification via the factor analysis method. Finally, the determinants of nursing staff's compensation contentment were examined from the remuneration framework, pay grade, performance-based incentives, and pay structure, with both correlation and regression methods employed for data analysis. According to the results of the analysis, the differences in overall satisfaction among public hospital employees of different genders, ages, civil statuses, hospital grades, occupational categories, and titles reached statistical significance ($P < 0.05$), and the linear regression model established for the compensation distribution of healthcare workers in public hospitals was: y Overall Satisfaction = $-2.036 + 0.521\times X_1$,$+ 0.291\times X_2 + 0.227\times X_3 + 0.179\times X_4$. Public hospital salary distribution should focus on improving the guaranteed and differentiated financial compensation mechanism, establishing a diverse and accountable remuneration system, constructing a salary level that meets the characteristics of the industry, optimizing and adjusting the salary structure, and setting up an evidence-based performance evaluation framework, among other measures, with the aim of enhancing the salary satisfaction of medical and nursing staff in public hospitals.*

KEYWORDS: *RBRVS; factor analysis; correlation analysis; regression analysis; salary distribution*

1 Introduction

It has always been difficult to assess the performance of various departments in public hospitals due to the wide range of responsibilities, many temporary affairs, and difficult to quantify the work, as well as the large number of people, complex structure, and different levels of education [1]. Mutual collaboration among various departments in public hospitals is the core of enhancing the effectiveness of hospitals, and improving their service capacity and management level, optimizing workflow, and improving work efficiency are the objective requirements for hospitals to implement a modern hospital management system and achieve high-quality development [2, 3]. --Following the launch of the new healthcare reform policy in 2009, China's central government released the “Guiding Opinions on the Pilot of the National Hospital Reform”, “New Hospital Management System”, and other policies, which have led to important breakthroughs in China's medical and healthcare services and into a new and vigorous stage of

*chenxuchenxu168@163.com
https://doi.org/10.65102/is2026441
Published: 30 April, 2026

development.

Subsequently, the Financial Supervisory Commission specified that hospitals should establish a holistic evaluation and compensation framework grounded in service quality and workload. By combining service quality and workload, a comprehensive and modern performance assessment mechanism is constructed, and appropriate salaries and benefits are determined based on this mechanism, which not only can effectively inspire staff motivation, but also helps to strengthen the government's supervision, prompting the government to more vigorously promote the development of the operation and management of public hospitals [4-6]. Since the 2020 New Crown Pneumonia epidemic, medical staff have faced the uncertainty of epidemic prevention and control, and have endured tremendous risks and work pressure, and the status and prestige of medical staff have been significantly enhanced [7]. The remuneration of medical staff is related to their dignity and labor value, through the optimization of the remuneration system in public hospitals, taking more powerful measures to improve and protect their remuneration can create favorable conditions for medical staff to work at ease and grow and progress, but also further enhance the public hospital public welfare attributes, which is of great significance [8, 9].

Research into the links among performance, compensation, and workforce outcomes in medical institutions has attracted growing scholarly attention. Wahyuhadi et al. (2023) [10] examined how performance, occupational contentment, and pay interacted among medical personnel throughout the neo-coronavirus outbreak, the data were taken from several databases of a general academic hospital in Indonesia, where there was a weak favorable association between staff contentment and remuneration and a significant positive correlation between salary and performance. Yingqian et al. (2024)[11] collected data on financial performance and compensation distribution of public hospitals in 30 provinces in China during 2014-2018 and quantitatively analyzed the relationship between the two based on the explanatory sequential mixed methods, and found that in hospitals with better financial status, the financial performance of hospitals can be improved through compensation incentives. Fatimah et al. (2025) [12] invited 10 stakeholders working in healthcare to present the impact of healthcare workers' salary allocation on job performance through four key steps: data collection, data cohesion, data presentation, and drawing conclusions, and the study pointed out that the optimization of employees' salary allocation effectively improves the performance performance of hospitals and solves the problems of low work efficiency and poor service quality.

As a fundamental pillar of the medical service system, the rationality and fairness of the remuneration system of hospitals directly affect the motivation of healthcare personnel as well as service delivery quality and efficiency. In recent years, with the continuous development of the medical system, hospital compensation frameworks have become the focus of attention of academics and policy makers at home and abroad. Quentin et al. (2018)[13] found that the NHS compensation structure in the UK is dominated by fixed pay, with an emphasis on work experience and standardized pay grades, with higher pay for more experience. Although the design of the UK's hospital pay model takes into account fairness and optimization potential, there is still room for improvement in motivating doctors to adapt to diverse clinical needs. Zhao et al. (2025)[14] investigated how the overhaul of the pay allocation framework in public hospitals affected the remuneration of healthcare workers, and analyzed the annual total salary and annual bonus compensation as the main indicators, and basic salary, allowances, and other forms of remuneration as the secondary indicators, and the study found that after the reform, the annual total salary and the annual performance pay of doctors were increased by 6.3% and 19.2%, respectively, and that the secondary indicators There are significant differences in gender, age and education.

Compensation distribution models based on performance appraisal have been widely used in healthcare organizations, and have an obvious function in advancing the growth of the healthcare sector. Ghaedi et al. (2018)[15] stated that a rational hospital pay distribution system maintains and enhances the efficiency of service delivery of healthcare human resources, for this purpose, a cross-sectional descriptive statistical method was used to study, the effect of performance appraisal based pay distribution model on diagnosis, treatment and personnel satisfaction in hospitals. Jabbari et al. (2019) [16] explored the challenges of pay for performance allocation in the healthcare industry from multiple perspectives, the study invited eleven stakeholders to conduct semi-structured interviews over a period of 45-60min with the aim of gathering relevant data, followed by an data study through thematic analysis using the MAXQDA12 software and obtained that performance appraisal based pay allocation model to some extent The model of pay distribution based on performance appraisal can improve the performance of employee performance related indicators to some extent. Aghajani et al. (2021) [17] investigated a new model of healthcare staff compensation distribution mediated by characteristics including work output, service recipient contentment, and full-time engagement rate, which demonstrably enhanced both the volume and standard of care in the healthcare sector through the incorporation of staff output assessment, thereby supporting the attainment of institutional healthcare objectives and safeguarding patient wellbeing. Wang et al. (2021) [18] studied the problem of performance-linked pay distribution within a public hospital, where the output of each department of the hospital was assessed by the super-efficiency DEA model, and the results of the performance appraisal integrated into pay-for-performance allocation were empirically analyzed, where the performance value of the DMU7 indicator of each department reached the highest value of 1.53, and the lowest value of the performance of the DMU9 indicator. Eghbali et al. (2025) [19] systematically analyzed the objectives, activities and actions, participants, incentives and disincentives of the pay-for-performance distribution system, and linking pay distribution with performance appraisal is helpful in improving teamwork among healthcare workers, which in turn provides better quality healthcare services and realizes integrated healthcare.

The article firstly introduces RBRVS, the performance pay appraisal method adopted in this study, and designs the performance pay allocation program based on RBRVS, which covers the division of labor in each department, the specific workflow, the specific performance appraisal indexes, the setting of the point value of RBRVS, which covers the division of labor in each department, the specific workflow, the specific performance appraisal indexes, the setting of the point value of RBRVS, and the way of calculating the performance pay of medical staff. Subsequently, taking nursing personnel from a top-tier public hospital in Province A as the survey object, the main calculation steps of factor analysis were theoretically analyzed, and the designed questionnaire was tested for reliability and validity. Subsequently, regression and single-factor analytical approaches, among other methods were used to explore the determinants of compensation contentment among medical and nursing staff in public hospitals, and correlation analysis and regression analysis were made on the survey data.

2 Design of a remuneration distribution scheme based on the RBRVS methodology

2.1 Methodology for performance pay appraisal

2.1.1 Concept of RBRVS

RBRVS represents a resource-driven appraisal framework grounded in the relative point value of basic resources, which can quantify health services.The theory is based on the consumption of resources by physicians, measured in terms of relative value, and mainly estimates the inputs of physicians in medical services.

2.1.2 RBRVS workload accounting

The basic idea behind the RBRVS is to derive the honorarium price ratio by determining the relative value ratio (RVU) for each medical service line, calculating the currency conversion factor (CF), and multiplying it by the RVU for each service.The key points of the RBRVS include determining the RVU for the physician's medical service line, calculating the currency conversion factor (CF), and deriving the honorarium price ratio by multiplying the CF by the RVU for each service. The key points of the RBRVS include determining the relative value ratio (RVU) for the physician's medical service line, calculating the currency conversion factor (CF), and extrapolating the product of the CF and the RVU for each service to derive the honorarium-price ratio:

$$\mathrm{RBRVS} = (\mathrm{TW}) \times (1 + \mathrm{RPC}) \times (1 + \mathrm{AST}) \tag{1}$$

2.2 Optimized design of remuneration distribution scheme for medical staff in public hospitals

2.2.1 Design objectives

The optimization program needs to follow the following objectives: (1) standardize performance management through the implementation of performance management, so as to guarantee that both departmental and hospital functions become more standardized and reasonable, so as to improve the overall operational efficiency. (2) Possess excellent technical skills, but also need to have a good educational background and extensive experience. (3) Ensure the fairness and impartiality of the performance pay distribution program.

2.2.2 Design principles

By establishing the principles of an effective optimization plan, it can provide strong guidance for the performance management of public hospitals, thus achieving higher efficiency and better results. The optimization scheme must comply with the following criteria: adhere to the principle of public welfare orientation, adhere to the principle of "more work, more pay, excellent performance, excellent pay" and adhere to the principle of scientific, objective and open, the medical staff performance pay distribution scheme construction principles as shown in Figure 1.

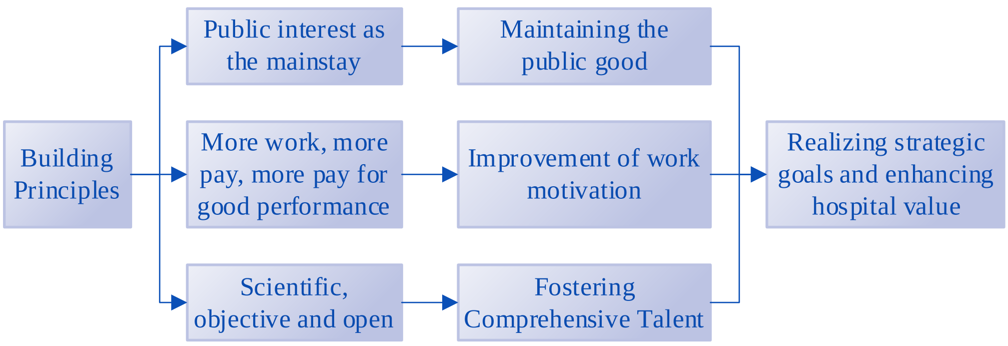

Figure 1: Principles for constructing a salary distribution plan

2.2.3 Design of specific performance appraisal indicators

The unit of accounting is based on the unit of the department, in order to take into account the principle of fairness and realize the principle of distribution of the hospital and department at the second level. Appraisal indicators include cost control indicators, workload points, medical consumables management, key performance indicators in four categories, as follows:

(1) Cost control indicators: in order to achieve cost control, it is necessary to consider the cost of crediting and accounting unit affordability.

(2) Workload indicators: “Workload” is an indicator that evaluates an individual's ability to reflect an employee's efficiency. This indicator may reflect someone's level of RBRVS.

(3) Medical consumables management: medical consumables performance indicators are incorporated into the departmental performance evaluation system, and individualized consumption ratio target values are formulated according to the characteristics of consumables use in different departments, and the consumption ratio target values are different in different departments.

2.2.4 Setting of RBRVS point values

(1) RBRVS Points Assignment Guidelines Workload points are the core of the RBRVS system, and workload points are composed of three parts: labor value points, practice cost points, and liability insurance points. The composition of workload points is shown in Figure 2.

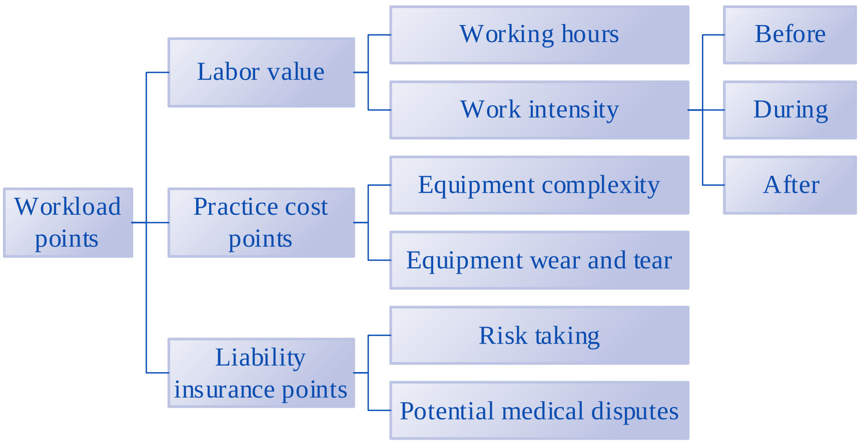

Figure 2: Composition of workload points

(2) RBRVS point value setting workload point setting is objective and fair and reasonable, the hospital can organize high-quality technical backbone, experts in related fields and the upper management of the hospital, together with the performance program design group to study and discuss.

2.2.5 Accounting for physician pay for performance

Based on RBRVS for physician unit performance allocation, the performance of a medical unit can be calculated by multiplying the workload of the physicians in the unit with the unit price of points, and then adding the results of KPI assessment to finally arrive at 100% performance.

Doctors' workload points are recorded and counted by the three major systems of HIS, Pacs and Lis, of which, the points of execution projects cover all aspects of clinical treatment, surgery, consultation and consultation, while the points of collaborative projects involve more skills and knowledge.

Physician point totals = total medical procedures conducted × corresponding point value per procedure.

According to the principle of RBRVS, the number of points for physician collaborative projects can be calculated by taking into account the collaboration factor. The number of points for each physician service is the responsibility of the performance appraisal team. Physician service volume points come from the number of outpatient visits, departmental discharge counts, inpatient bed occupancy days, along with the volume of surgical procedures. The controllable costs of the medical unit include the cost of non-priceable consumables in the department, medical waste disposal fees, office consumables, and gowns and hospital gowns out of the laundry.

Public hospitals have a secondary allocation based on the attending physician accountability framework. Under this framework, disease-specific specialist teams are formed and led by the head of the discipline or the head of the discipline. The ward director establishes group performance coefficients based on the workload of each specialty group, establishes assessment, reward and punishment coefficients based on key performance indicators, and carries out secondary distribution. The secondary distribution is computed using the following equation: Group performance = (90% of the unit doctors' aggregate workload performance × group performance coefficient) + (10% of the unit doctors' aggregate workload performance × appraisal rewards and penalties coefficient). Individual physician performance = title factor × physician panel performance

2.2.6 Accounting for nurses'performance-based compensation

Drawing on the RBRVS framework for nursing unit pay distribution, the primary allocation formula is as follows: Nursing unit performance = [(number of nursing workload points in this unit × nursing unit classification factor) × point unit price - nursing unit controllable cost] × key performance indicators (KPIs) appraisal results × 100%. Nursing workload points are performance points that a nurse can earn for performing various types of nursing work. Collaborative nursing project points are for projects carried out jointly by doctors and nurses, with nurses receiving 50% of the points for the project. Nursing service volume points are usually based on the number of patients discharged from the ward, the number of occupied bed days, and the number of surgical procedures. Nursing unit classification factors were determined by the central nursing team using cluster analysis based on the degree of difficulty of the same operation in different wards.

Nursing unit performance allocation: 90% is based on workload, work quality, rewards and penalties, and 10% is determined by the head nurse of the unit. The specific secondary distribution formula is as follows:

Individual Nurse Performance = (90% Total Nursing Unit Performance + Total Nursing Unit Position Shift Factor x Individual Position Shift Factor and x Individual Comprehensive Quality of Care Score + Incentive and Penalty Performance) + 10% Individual Nurse Earnings from Reserved Nursing Unit Performance.

2.2.7 Accounting for pay for medical performance

Based on RBRVS for medical technology unit performance allocation, the formula for one allocation is as follows:

Medical-technical unit performance = ($\sum$ number of project cases × number of project points - medical-technical unit controllable cost) × key performance indicator (KPI) assessment results × 100%

According to the different levels of medical and technical personnel, different grade coefficients are given to individual performance allocation. The medical and technical unit refers to the allocation model of the medical unit and allocates 90% of the unit's total activity according to the workload and the level of appointment, reserving 10% to be allocated by the unit's managers according to the work evaluation objectives. The evaluation of individual medical technology positions includes four main aspects: efficiency, service quality, system standardization and internal evaluation. The secondary distribution formula is as follows:

Medical technology individual performance = individual performance allocation coefficient $\div \sum$ performance allocation coefficient of all personnel within the department × 90% of the total departmental performance + rewards and penalties performance.

3 Methodology for the study of satisfaction with the distribution of nursing and medical personnel in public healthcare institutions

3.1 Selection of survey respondents

3.1.1 Subject of the study

From August to September 2024, nursing staff from a top-tier public hospital in Province A were used as survey respondents, and anonymous completion was mainly carried out by utilizing an online questionnaire platform. In total, 1500 valid questionnaires were collected throughout this study, achieving a validity rate of 100%.

3.1.2 Research tools

The questionnaire was mainly based on the Pay Distribution Satisfaction Scale (PSQ) designed by Heneman and Schwab study, including pay system (4 questions), pay level (4 questions), performance distribution (4 questions), pay structure (6 questions) and overall satisfaction (4 questions), totaling 22 questions. The questionnaire utilized a 5-point Likert scale, assigning ratings of 5, 4, 3, 2, and 1 extremely satisfied, fairly satisfied, average, fairly unsatisfied, and extremely unsatisfied, respectively.

3.1.3 Organization and analysis of information

Excel was utilized to create the database and the data were rigorously cleaned. SPSS was used for statistical description and test analysis and regression analysis.

3.2 Research methodology

3.2.1 Raw Data and Correlation Matrix

Actually the application of factor analysis into the examination of an object is the investigation of possible connections between the attributes of that object. The original data, namely, the sample values, have been given two random variables x, y, which can be considered two variables A, B, and the actual values of their contents are measured in n specimens:

$$\vec{x} = \left(x_1, x_2, \cdots\cdots, x_n\right) \tag{2}$$

$$\vec{y} = \left(y_1, y_2, \cdots\cdots, y_n\right) \tag{3}$$

The samples were initially standardised and their mean and variance computed using the formula below:

$$\overline{x} = \frac{1}{n}\sum_{i=1}^{n} x_i, \overline{y} = \frac{1}{n}\sum_{i=1}^{n} y_i \tag{4}$$

$$\sigma_x^2 = \frac{1}{n}\sum_{i=1}^{n}\left(x_i - \overline{x}\right)^2 \tag{5}$$

$$\sigma_y^2 = \frac{1}{n}\sum_{i=1}^{n}\left(y_i - \overline{y}\right)^2 \tag{6}$$

Re-order:

$$x_i' = \frac{x_i - \overline{x}}{\sigma_x}, y_i' = \frac{y_i - \overline{y}}{\sigma_y}, i = 1, 2 \cdots\cdots, n \tag{7}$$

After standardization, the sample satisfies the following requirements:

$$\begin{gathered} \overline{x'} = \frac{1}{n}\sum_{i=1}^{n} x_i' = 0, \overline{y'} = \frac{1}{n}\sum_{i=1}^{n} y_i' = 0 \\ \sigma_{x'}^2 = \frac{1}{n}\sum_{i=1}^{n} x_i'^2 = 1, \sigma_{y'}^2 = \frac{1}{n}\sum_{i=1}^{n} y_i'^2 = 1 \end{gathered} \tag{8}$$

Here, $\vec{x}, \vec{y}$ denote the samples after standardization, and their variances and correlation coefficients can be computed via the following expressions:

$$\begin{cases} \sigma_x^2 = \frac{1}{n}\sum_{i=1}^{n} x_i^2 = \frac{1}{n}\overrightarrow{x'x} = 1 \\ \sigma_y^2 = \frac{1}{n}\sum_{i=1}^{n} y_i^2 = \frac{1}{n}\overrightarrow{y'y} = 1 \\ Y_{xy} = \frac{1}{n}\sum_{i=1}^{n} x_i y_i = \frac{1}{n}\overrightarrow{x'y} \end{cases} \tag{9}$$

As demonstrated, the random variables $\vec{x}, \vec{y}$ are uncorrelated, $Y_{xy} = 0$, which equates to their inner product $\vec{x}'\vec{y} = 0$, and geometrically to the orthogonality of the two vectors.

Given n samples, each containing m variables, the original data matrix is defined as follows:

$$X = \begin{bmatrix} x_{11} & x_{12} & \cdots & x_{1m} \\ x_{21} & x_{22} & \cdots & x_{2m} \\ \cdots & \cdots & \cdots & \cdots \\ x_{n1} & x_{n2} & \cdots & x_{nm} \end{bmatrix} = \left[\vec{x}_1, \vec{x}_2, \cdots, \vec{x}_m\right] \tag{10}$$

The column vector at the right end of the equation:

$$\vec{x}_j = \left(x_{1j}, x_{2j}, \cdots, x_{nj}\right)', j = 1, 2, \cdots, m \tag{11}$$

The observation corresponding to the j th variable across the n th samples can be interpreted as a point or vector in n-dimensional Euclidean space, symbolized here by $\vec{x}_j$, The relationships among the original variables are then analyzed by evaluating the positional relationships of these m points or vectors. When the sample data is normalized(i.e.,X is a normalized matrix),the following conditions hold:

$$\begin{aligned} \vec{x}_j &= \frac{1}{n}\sum_{i=1}^{n} x_{ij} = 0 \\ \sigma_j^2 &= \frac{1}{n}\sum_{i=1}^{n} x_{ij}^2 = \frac{1}{n}\vec{x}_j{}'\vec{x}_j = 1,2,\cdots,m \end{aligned} \tag{12}$$

Accordingly, the correlation coefficient between $\vec{x}_j$ and $\vec{x}_k$ is, by Eq:

$$Y_{jk} = \frac{1}{n}\sum_{i=1}^{n} x_{ij}x_{ik} = \frac{1}{n}\vec{x}_j'\vec{x}_k,\ j,k = 1,2,\cdots,m \tag{13}$$

The correlation coefficient matrix R is formed by the pairwise correlation coefficients of the m variables:

$$R = \begin{bmatrix} r_{11} & r_{12} & \cdots & r_{1m} \\ r_{21} & r_{22} & \cdots & r_{2m} \\ \cdots & \cdots & \cdots & \cdots \\ r_{m1} & r_{m2} & \cdots & r_{mm} \end{bmatrix} = \frac{1}{n}x'x \tag{14}$$

The correlation coefficient matrix R has symmetry and is at least semi positive definite implying that all of its eigenvalues are non negative.

Correlation coefficient matrix is a point of departure of the factor analysis method and one of the major aspects of factor analysis is to examine the structure of the correlation matrix. Besides factor analysis, we also frequently consider the correlation coefficient matrix between two sets of variables, namely supposing that apart from the initial m random variables, there exist additional p random variables, then the matrix has the form:

$$y = \begin{bmatrix} y_{11} & y_{12} & \cdots & y_{1p} \\ y_{21} & y_{22} & \cdots & y_{2p} \\ \cdots & \cdots & \cdots & \cdots \\ y_{n1} & y_{n2} & \cdots & y_{np} \end{bmatrix} = \left[\vec{y}_1, \vec{y}_2, \cdots, \vec{y}_p\right] \tag{15}$$

Assuming all standardized data, the correlation coefficient between $\vec{y}_k$ and $\vec{x}_j$ is obtained from equation (14):

$$S_{kj} = \frac{1}{n}\vec{y}_k{}'\vec{x}_j, k = 1,2,\cdots,p;\ j = 1,2,\cdots,m \tag{16}$$

Written in matrix form as follows:

$$S_{p\times m}=\begin{bmatrix} S_{11} & S_{12} & \cdots & S_{1m} \\ S_{21} & S_{22} & \cdots & S_{2m} \\ \cdots & \cdots & \cdots & \cdots \\ S_{p1} & S_{p2} & \cdots & S_{pm} \end{bmatrix}=\begin{bmatrix} \frac{1}{n}\vec{y}_1\vec{x}_1 & \frac{1}{n}\vec{y}_1{}'\vec{x}_2 & \cdots & \frac{1}{n}\vec{y}_1{}'\vec{x}_m \\ \frac{1}{n}\vec{y}_2{}'\vec{x}_1 & \frac{1}{n}\vec{y}_2{}'\vec{x}_2 & \cdots & \frac{1}{n}\vec{y}_2{}'\vec{x}_m \\ \cdots & \cdots & \cdots & \cdots \\ \frac{1}{n}\vec{y}_p{}'\vec{x}_1 & \frac{1}{n}\vec{y}_p{}'\vec{x}_2 & \cdots & \frac{1}{n}\vec{y}_p{}'\vec{x}_m \end{bmatrix} \tag{17}$$

$$=\frac{1}{n}\begin{bmatrix} \vec{y}_1{}' \\ \vec{y}_2{}' \\ \vdots \\ \vec{y}_p{}' \end{bmatrix}\left[\vec{x}_1,\vec{x}_2,\cdots,\vec{x}_m\right]=\frac{1}{n}Y'X$$

3.2.2 Mathematical model of factor analysis

The common factor of factor analysis can, in fact, be expressed in the following linear algebraic form:

$$\begin{cases} \vec{x}_1 = a_{11}\vec{f}_1 + a_{21}\vec{f}_2 + \cdots + a_{p1}\vec{f}_p + \mu_1\vec{\varepsilon}_1 \\ \vec{x}_2 = a_{12}\vec{f}_1 + a_{22}\vec{f}_2 + \cdots + a_{p2}\vec{f}_p + \mu_2\vec{\varepsilon}_2 \\ \cdots \\ \vec{x}_m = a_{1m}\vec{f}_1 + a_{2m}\vec{f}_2 + \cdots + a_{pm}\vec{f}_p + \mu_m\vec{\varepsilon}_m \end{cases} \tag{18}$$

This can be expressed in condensed form as:

$$\vec{x}_j = \sum_{k=1}^{p} a_{kj}\vec{f}_k + \mu_j\vec{\varepsilon}_j,\ j=1,2,\cdots,m \tag{19}$$

In this equation, $\vec{f}_1,\vec{f}_2,\cdots\cdots,\vec{f}_p$ and $\vec{\varepsilon}_1,\vec{\varepsilon}_2,\cdots\cdots,\vec{\varepsilon}_m$ represent the newly introduced variables to be determined. The first set is referred to as common factors, interpretable as shared variance components, while the second set constitutes unique factors, also known as individual-specific factors. The positive integer P denotes the count of common factors, which is considerably fewer than the total number of original variables m ,the equation thus reflects a dimensional reduction of the original m variables into a limited set of underlying factors. The coefficients a_{kj} and $\mu_j(j=1,2,\cdots\cdots,m;k=1,2,\cdots\cdots,p)$ are termed factor loadings, distinguished as shared factor loadings for the former and unique factor loadings for the latter. Given that the analysis centers on shared factors, references to factor loadings in this context pertain exclusively to the former.

Notation:

$$A=\begin{bmatrix} a_{11} & a_{12} & \cdots & a_{1m} \\ a_{21} & a_{22} & \cdots & a_{2m} \\ \cdots & \cdots & \cdots & \cdots \\ a_{p1} & a_{p2} & \cdots & a_{pm} \end{bmatrix}_{p\times m} \tag{20}$$

where a_{kj} is the loading of the jth variable on the kth factor $(k=1,2,\cdots\cdots,p;\ j=1,2,\cdots\cdots,m)$.

$$F=\left[\vec{f}_1,\vec{f}_2,\cdots,\vec{f}_p\right]=\begin{bmatrix} f_{11} & f_{12} & \cdots & f_{1p} \\ f_{21} & f_{22} & \cdots & f_{2p} \\ \cdots & \cdots & \cdots & \cdots \\ f_{n1} & f_{n2} & \cdots & f_{np} \end{bmatrix}_{n\times p} \tag{21}$$

This kth column is the value of the kth factor on each specimen, and the matrix is known as the factor measure.

$$U=\begin{bmatrix} u_1 & 0 & \cdots & 0 \\ 0 & u_2 & \cdots & 0 \\ \cdots & \cdots & \cdots & \cdots \\ 0 & 0 & \cdots & u_m \end{bmatrix}_{m\times m} \tag{22}$$

Here, the resulting structure is an m-order diagonal matrix in which each diagonal entry u_j represents the weight $(j=1,2,\cdots\cdots,m)$ that variable X_j carries on its corresponding unique factor ε_j. Specifically:

$$E=\left[\vec{\varepsilon}_1,\vec{\varepsilon}_2,\cdots,\vec{\varepsilon}_m\right]=\begin{bmatrix} \varepsilon_{11} & \varepsilon_{12} & \cdots & \varepsilon_{1m} \\ \varepsilon_{21} & \varepsilon_{22} & \cdots & \varepsilon_{2m} \\ \cdots & \cdots & \cdots & \cdots \\ \varepsilon_{n1} & \varepsilon_{n2} & \cdots & \varepsilon_{nm} \end{bmatrix} \tag{23}$$

where the jth column is the value of ε_j taken on each specimen. Then equation (23) can be rewritten in the following form:

$$\left[\vec{x}_1,\vec{x}_2,\cdots,\vec{x}_m\right]=\left[\vec{f}_1,\vec{f}_2,\cdots,\vec{f}_p\right]\begin{bmatrix} \mathrm{a}_{11} & \mathrm{a}_{12} & \cdots & \mathrm{a}_{1m} \\ \mathrm{a}_{21} & \mathrm{a}_{22} & \cdots & \mathrm{a}_{2m} \\ \cdots & \cdots & \cdots & \cdots \\ \mathrm{a}_{p1} & \mathrm{a}_{p2} & \cdots & \mathrm{a}_{pm} \end{bmatrix}+\left[\vec{\varepsilon}_1,\vec{\varepsilon}_2,\cdots,\vec{\varepsilon}_m\right]\begin{bmatrix} u_1 & 0 & \cdots & 0 \\ 0 & u_2 & \cdots & 0 \\ \cdots & \cdots & \cdots & \cdots \\ 0 & 0 & \cdots & u_m \end{bmatrix} \tag{24}$$

$$X=FA+EU$$

3.2.3 Factor loads

It has been established that the original variables $\vec{x}_j$ in Eq. (23) are all standardized. Building on this, we further suppose that the unknown common factors $\vec{f}_k(\mathrm{k}=1,2,\cdots\cdots,\mathrm{p})$ and the unique factors $\vec{\varepsilon}_j(\mathrm{j}=1,2,\cdots\cdots,\mathrm{m})$ likewise follow standardized distributions, and that the inter-correlations among all common factors as well as among the unique factors are each equal to zero. Proceeding from this, according to Eq:

$$\begin{cases} \frac{1}{n}\sum_{i=1}^{n} f_{ik} = 0, k = 1,2,\cdots,p \\ \frac{1}{n}\sum_{i=1}^{n} \varepsilon_{ij} = 0, j = 1,2,\cdots,m \\ \frac{1}{n}\vec{f}_k{}'\vec{f}_\ell = \delta_{k\ell} = \begin{cases} 1, k = \ell \\ 0, k \neq \ell \end{cases} k,\ell = 1,2,\cdots,p \\ \frac{1}{n}\vec{\varepsilon}_j{}'\vec{\varepsilon}_q = \delta_{jq} = \begin{cases} 1, j = q \\ 0, j \neq q \end{cases} j,q = 1,2,\cdots,m \\ \frac{1}{n}\vec{f}_k{}'\vec{\varepsilon}_j = 0, k = 1,2,\cdots,p; j = 1,2,\cdots,m \end{cases} \tag{25}$$

The relational equations are represented in matrix format and to find the correlation matrix between the metrics, we need to use Eq.

$$\frac{1}{n}F'F = \frac{1}{n}\begin{bmatrix} \vec{f}_1{}' \\ \vec{f}_2{}' \\ \vdots \\ \vec{f}_p{}' \end{bmatrix}\left[\vec{f}_1, \vec{f}_2, \cdots, \vec{f}_p\right] = \begin{bmatrix} \frac{1}{n}\vec{f}_1{}'\vec{f}_1 & \frac{1}{n}\vec{f}_1{}'\vec{f}_2 & \cdots & \frac{1}{n}\vec{f}_1{}'\vec{f}_p \\ \frac{1}{n}\vec{f}_2{}'\vec{f}_1 & \frac{1}{n}\vec{f}_2{}'\vec{f}_2 & \cdots & \frac{1}{n}\vec{f}_2{}'\vec{f}_p \\ \cdots & \cdots & \cdots & \cdots \\ \frac{1}{n}\vec{f}_p{}'\vec{f}_1 & \frac{1}{n}\vec{f}_p{}'\vec{f}_2 & \cdots & \frac{1}{n}\vec{f}_p{}'\vec{f}_p \end{bmatrix} = \begin{bmatrix} 1 & 0 & \cdots & 0 \\ 0 & 1 & \cdots & 0 \\ \cdots & \cdots & \cdots & \cdots \\ 0 & 0 & \cdots & 1 \end{bmatrix} = I_p \tag{26}$$

where I_p is the p-order identity matrix. By the same reasoning, the inter-correlation matrix among the unique factors yields:

$$\frac{1}{n}E'E = I_m \tag{27}$$

Subsequently, the cross-correlation matrix linking the common factors and the unique factors is expressed as:

$$\frac{1}{n}F'E = \frac{1}{n}\begin{bmatrix} \vec{f}_1{}' \\ \vec{f}_2{}' \\ \vdots \\ \vec{f}_p{}' \end{bmatrix}\left[\vec{\varepsilon}_1, \vec{\varepsilon}_2, \cdots, \vec{\varepsilon}_m\right] = \begin{bmatrix} \frac{1}{n}\vec{f}_1{}'\vec{\varepsilon}_1 & \frac{1}{n}\vec{f}_1{}'\vec{\varepsilon}_2 & \cdots & \frac{1}{n}\vec{f}_1{}'\vec{\varepsilon}_m \\ \frac{1}{n}\vec{f}_2{}'\vec{\varepsilon}_1 & \frac{1}{n}\vec{f}_2{}'\vec{\varepsilon}_2 & \cdots & \frac{1}{n}\vec{f}_2{}'\vec{\varepsilon}_m \\ \cdots & \cdots & \cdots & \cdots \\ \frac{1}{n}\vec{f}_p{}'\vec{\varepsilon}_1 & \frac{1}{n}\vec{f}_p{}'\vec{\varepsilon}_2 & \cdots & \frac{1}{n}\vec{f}_p{}'\vec{\varepsilon}_m \end{bmatrix} = \begin{bmatrix} 0 & \cdots & 0 \\ \cdots & \cdots & \cdots \\ 0 & \cdots & 0 \end{bmatrix} = H \tag{28}$$

where Ⓗ in is the zero matrix.

By applying the above formula, the cross-correlation matrix between the derived common factors and the original variables can be expressed as:

$$\begin{bmatrix} \frac{1}{n}\vec{f}_1{}'\vec{x}_1 & \frac{1}{n}\vec{f}_1{}'\vec{x}_2 & \cdots & \frac{1}{n}\vec{f}_1{}'\vec{x}_m \\ \frac{1}{n}\vec{f}_2{}'\vec{x}_1 & \frac{1}{n}\vec{f}_2{}'\vec{x}_2 & \cdots & \frac{1}{n}\vec{f}_2{}'\vec{x}_m \\ \cdots & \cdots & \cdots & \cdots \\ \frac{1}{n}\vec{f}_p{}'\vec{x}_1 & \frac{1}{n}\vec{f}_p{}'\vec{x}_2 & \cdots & \frac{1}{n}\vec{f}_p{}'\vec{x}_m \end{bmatrix} = \frac{1}{n}\begin{bmatrix} \vec{f}_1{}' \\ \vec{f}_2{}' \\ \vdots \\ \vec{f}_p{}' \end{bmatrix}\left[\vec{x}_1, \vec{x}_2, \cdots, \vec{x}_m\right] = \frac{1}{n}F'X$$

$$= \frac{1}{n}F'FA + \frac{1}{n}F'EU = I_p A + \Theta U = A \tag{29}$$

This demonstrates that each element in the factor loading matrix A corresponds to the correlation coefficient between a given common factor and its associated original variable

$$\frac{1}{n}\vec{f}_k{}'\vec{x}_j = \mathrm{a}_{kj}, k = 1, 2, \cdots, p; j = 1, 2, \cdots, m \tag{30}$$

The factor loading a_{kj} reflects the link between the factor $\vec{f}_k$ and the variable $\vec{x}_j$, and when $a_{kj} > 0$, it indicates that the factor $\vec{f}_k$ and the variable $\vec{x}_j$ are Positive correlation. When $a_{kj} < 0$, it indicates an inverse correlation between the factor $\vec{f}_k$ and the variable $\vec{x}_j$. When $a_{kj} \approx 0$, it means that the link between the factor $\vec{f}_k$ and the variable $\vec{x}_j$ is weak.

The factor loading a_{kj} reflects the link between the factor $\vec{f}_k$ and the variable $\vec{x}_j$. A positive value of a_{kj} signals a direct relationship between $\vec{f}_k$ and $\vec{x}_j$ whereas a negative value of a_{kj} points to an opposing relationship between $\vec{f}_k$ and $\vec{x}_j$. A value of a_{kj} approaching zero suggests that the association between $\vec{f}_k$ and $\vec{x}_j$ is negligible.

Denote the correlation array R as:

$$\begin{aligned} R &= \frac{1}{n}X'X = \frac{1}{n}(FA+EU)'(FA+EU) \\ &= \frac{1}{n}A'F'FA + \frac{1}{n}U'E'FA + \frac{1}{n}A'F'EU + \frac{1}{n}U'E'EU \\ &= A'\left(\frac{1}{n}F'F\right)A + U'\left(\frac{1}{n}E'F\right)A + A'\left(\frac{1}{n}F'E\right)U + U'\left(\frac{1}{n}E'E\right)U \\ &= A'A + U'U = R^* + \begin{bmatrix} u_1^2 & 0 & \cdots & 0 \\ 0 & u_2^2 & \cdots & 0 \\ \cdots & \cdots & \cdots & \cdots \\ 0 & 0 & \cdots & u_m^2 \end{bmatrix} \end{aligned} \tag{31}$$

Among them:

$$R^* = A'A \tag{32}$$

which denotes the approximated correlation matrix, capturing the raw inter-variable correlation coefficients, with off-diagonal elements consistent with those in R:

$$r_{ij} = \sum_{k=1}^{p} a_{ki} a_{kj}, i, j = 1, 2, \cdots, m \tag{33}$$

The entries along the main diagonal of R^* are:

$$h_j^2 = \sum_{k=1}^{p} a_{kj}^2 = 1 - u_j^2, j = 1, 2, \cdots, m \tag{34}$$

The h_j^2 is termed the communality of variable $\vec{x}_j$, quantifying the proportion of that variable's total variance attributable to the shared factors, and is numerically equivalent to the cumulative sum of squared loadings in the jth column of A. Communality reflects how well the p common factors collectively account for each original variable's variance, ranging from 0 to 1, with higher values indicating stronger shared factor representation.

The aggregate of all communalities across variables is derived as follows:

$$\sum_{j=1}^{m} h_j^2 = \sum_{j=1}^{m} \sum_{k=1}^{p} a_{kj}^2 = \sum_{k=1}^{p} \sum_{j=1}^{m} a_{kj}^2 = \sum_{k=1}^{p} S_k^2 \tag{35}$$

Among them:

$$S_k^2 = \sum_{j=1}^{m} a_{kj}^2, k = 1, 2, \cdots, p \tag{36}$$

This quantity is termed the variance contribution of factor $\vec{f}_k$, computed as the sum of squared loadings across the kth row of A, and serves as a measure of the relative importance, or explanatory weight, that factor $\vec{f}_k$ carries within the full set of common factors, with the same directional relationship of a positive association.

3.3 Scale Reliability and Validity Analysis

3.3.1 Reliability analysis

The reliability of each subscale of salary satisfaction is shown in Table 1. The minimum Cronbach's alpha among all dimensions reached 0.833, while the overall scale yielded a Cronbach's alpha of 0.935, demonstrating that the instrument maintains strong internal consistency and that the study findings exhibit high reliability.

Table 1: The reliability of each subscale of salary satisfaction

Dimension	Alpha	Scale Alpha
Salary system	0.833	0.935
Salary level	0.846	
Performance distribution	0.936	
Compensation structure	0.865	
Comprehensive satisfaction	0.906	

3.3.2 Structural validity analysis

As mentioned earlier, the scale used in this study had a high degree of reliability. The questionnaire demonstrated satisfactory overall quality. Accordingly, exploratory factor analysis was employed to examine the structural validity of the scale. The KMO and Bartlett's test results are presented in Table 2. The KMO statistic for each dimensional subscale serves as a key criterion for determining whether the dataset is amenable to factor analysis. A KMO value exceeding 0.5 indicates that the data are acceptable for factor analysis, while a value surpassing 0.7 suggests that the data are well-suited for such analysis. From the table, the KMO value of salary system is 0.755, which is greater than 0.5, and the P-value of Bartlett's spherical test is 0.000, which is less than 0.05. Based on the KMO criterion, the dataset can be considered highly appropriate for factor analysis. The analytical process confirmed that the reliability and validity of each subscale were robustly established, laying a solid foundation for subsequent data analysis.

Table 2: KMO and bartlett test

		Salary system	Salary level	Performance distribution	Compensation structure	Comprehensive satisfaction
KMO sampling appropriateness quantity		0.755	0.683	0.666	0.823	0.851
Bartlett's sphericity test	The card square read last time	268.336	395.62	103.371	553.264	235.31
	Degree of freedom	22	12	12	12	12
	Significance	0.000	0.000	0.000	0.000	0.000

4 Analysis of findings

4.1 Single-factor analysis of the impact of pay satisfaction

In this study, one-way factor analysis was used to conduct an initial examination of variation in compensation system contentment, pay grade contentment, performance allocation contentment, and overall contentment across respondents with differing demographic backgrounds. Among them, the independent sample t-test was used to study the influence of gender and hospital grade factors on compensation dimension contentment; the Kruskal-Wallis test was applied to examine the effect of civil status on contentment with pay grade, performance allocation and pay structure; occupational category was similarly assessed via the Kruskal-Wallis test for its influence on compensation dimension contentment; job title and positional rank were evaluated through the Kruskal-Wallis test for their effect on pay grade contentment, with the remaining variables analyzed by ANOVA. The univariate analysis of determinants of pay grade contentment is shown in Table 3.

(1) When examining gender, age, civil status, hospital grade and occupational category in relation to compensation system and pay grade contentment, statistically significant differences were identified among public hospital employees across all these demographic variables ($P<0.05$).

(2) When examining gender, age, civil status, hospital grade and occupational category in relation to compensation system and pay grade contentment, statistically significant differences were identified among public hospital employees across all these demographic variables ($P<0.05$).

(3) When age, civil status, hospital grade and occupational category were evaluated in relation to pay structure contentment, significant inter-group differences in pay structure contentment emerged among public hospital employees of differing ages, civil statuses, hospital grades and occupational categories (P<0.05).

(4) When gender, age, civil status, hospital grade, occupational category and professional title were examined against overall contentment, significant differences in overall contentment were observed among public hospital employees across all the aforementioned demographic dimensions (P<0.05).

Table 3: Univariate analysis of determinants of compensation contentment

Dimension	P								
	gender	Age	Marital status	Educational background	Hospital grade	Job Category	Professional title	Position	Years of working experience
Salary system	0.011*	0.017*	0.000*	0.215	0.000*	0.000*	0.071	0.669	0.437
Salary level	0.006*	0.04*	0.021*	0.229	0.000*	0.000*	0.285	0.252	0.904
Performance distribution	0.195	0.049	0.001*	0.085	0.000*	0.000*	0.026*	0.987	0.517
Compensation structure	0.055	0.004*	0.011*	0.3	0.000*	0.000*	0.068	0.957	0.949
Comprehensive satisfaction	0.028*	0.009*	0*	0.215	0.000*	0.000*	0.047*	0.695	0.554

(1) Different gender groups

The independent sample t-test of gender and pay satisfaction is shown in Table 4. In the independent samples t-test of gender factor and satisfaction with pay system, satisfaction with pay level and comprehensive satisfaction, the differences between public hospital employees of different genders in terms of satisfaction with pay system, pay level and comprehensive satisfaction were statistically significant (P<0.05), and the pay satisfaction scores of male employees were higher than that of females.

Table 4: Independent sample t-test of gender and salary satisfaction

Dimension	Group	Satisfaction score	t	P
Salary system	Male	3.76±0.95	2.466	0.019*
	Female	3.83±0.94		
Salary level	Male	3.34±0.98	2.79	0.005*
	Female	3.01±1		
Performance distribution	Male	3.61±0.87	1.874	0.069
	Female	3.32±0.85		
Compensation structure	Male	3.4±0.84	1.409	0.191
	Female	3.26±0.98		
Comprehensive satisfaction	Male	3.56±0.92	2.272	0.028*
	Female	3.2±0.86		

(2) Different age groups

The analysis of variance (ANOVA) between age and pay satisfaction is shown in Table 5. In the analysis of variance between age factor and pay system, pay level, pay structure and overall satisfaction, the differences between public hospital employees of different ages on pay system, pay level, pay structure and overall satisfaction were statistically significant (P<0.05), and employees aged 31-40 years old had the highest pay satisfaction scores, while those aged 51 years old and above had the lowest pay satisfaction scores.

Table 5: Analysis of variance between age and salary satisfaction

Dimension	Group	Satisfaction score	t	P
Salary system	Aged 20 to 30	3.72±0.9	3.663	0.011*
	Aged 31 to 40	3.78±0.99		
	Aged 41 to 50	3.63±0.82		
	51 years old and above	3.13±1.11		
Salary level	Aged 20 to 30	3.18±1.09	2.826	0.042*
	Aged 31 to 40	3.22±0.99		
	Aged 41 to 50	3.08±0.92		
	51 years old and above	2.86±1.01		
Compensation structure	Aged 20 to 30	2.95±0.91	3.862	0.005*
	Aged 31 to 40	3.1±0.83		
	Aged 41 to 50	3±0.99		
	51 years old and above	2.71±0.95		
Comprehensive satisfaction	Aged 20 to 30	3.33±0.87	3.733	0.013*
	Aged 31 to 40	3.39±0.86		
	Aged 41 to 50	3.48±0.82		
	51 years old and above	3.04±0.88		

(3) Different marital status groups

The one-way analysis of marital status and satisfaction with salary is shown in Table 6 (a is F value, b is H value, * denotes statistical significance at the 5% threshold). When civil status was examined against compensation dimension contentment, meaningful inter-group differences in compensation dimension contentment were found among public hospital employees with varying civil statuses ($P<0.05$), and the satisfaction with salary dimensions among married employees was higher than that of unmarried employees.

Table 6: Single-factor analysis of civil status and compensation contentment

Dimension	Group	Satisfaction score	t	P
Salary system	Unmarried	3.76±0.81	9.765[a]	0.000*
	Married	3.36±0.93		
	Other	3.82±1		
Salary level	Unmarried	3.48±1	13.556[b]	0.001*
	Married	3.1±0.87		
	Other	3.74±1		
Performance distribution	Unmarried	3.73±0.97	11.652[b]	0.005*
	Married	3.35±0.86		
	Other	4±1		
Compensation structure	Unmarried	3.41±0.95	13.635[b]	0.002*
	Married	3.07±0.86		
	Other	3.57±1		
Comprehensive satisfaction	Unmarried	3.43±0.81	9.852[a]	0.000*
	Married	3.19±0.85		
	Other	3.58±1		

(4) Different hospital class categories

The between-group comparison of hospital grade and compensation contentment is presented in Table 7. When hospital grade was assessed against compensation dimension contentment via independent samples t-test, meaningful disparities in compensation dimension contentment were identified among public hospital employees across different hospital grades ($P<0.05$), with compensation dimension contentment among staff at top-tier public hospitals exceeding that of their counterparts at secondary-level institutions.

Table 7: Independent sample t-test of hospital and salary satisfaction

Dimension	Group	Satisfaction score	t	P
Salary system	Level 3	3.97±0.95	5.131	0.000*
	Level 2	3.44±0.97		
Salary level	Level 3	3.16±1	4.449	0.000*
	Level 2	3.22±0.91		
Performance distribution	Level 3	3.45±0.94	4.394	0.000*
	Level 2	3.25±0.84		
Compensation structure	Level 3	3.48±0.87	4.751	0.000*
	Level 2	3.11±0.86		
Comprehensive satisfaction	Level 3	3.56±0.91	5.146	0.000*
	Level 2	3.41±0.93		

(5) Different job category groups

The Kruskal-Wallis test of job categories and satisfaction with pay is shown in Table 8. In the Kruskal-Wallis test of occupational category and compensation dimension contentment, statistically significant inter-group disparities ($P<0.05$) were observed in compensation dimension contentment among public hospital employees across different occupational categories, with compensation dimension contentment among healthcare workers falling below that of employees in other positions.

Table 8: The kruskal-wallis survey of job categories and compensation satisfaction

Dimension	Group	Satisfaction score	H	P
Salary system	Doctor	3.42±0.82	47.536	0.000*
	Nursing	3.1±0.86		
	Medical Skill	4.04±1		
	Potion	3.83±0.95		
	Management	3.76±0.95		
	Logistics	4.09±1		
	Other	4.14±1		
Salary level	Doctor	3.3±0.68	27.703	0.000*
	Nursing	2.97±0.93		
	Medical Skill	3.41±1.05		
	Potion	3.16±1		
	Management	3.46±0.96		
	Logistics	3.64±1		
	Other	3.9±1		
Performance distribution	Doctor	3.39±0.83	32.366	0.000*
	Nursing	3.37±0.91		
	Medical Skill	3.57±1		
	Potion	3.53±0.93		
	Management	4.12±1		
	Logistics	3.94±1		
	Other	4.04±1		
Performance distribution	Doctor	3.22±0.86	35.221	0.000*
	Nursing	3.14±0.8		
	Medical Skill	3.29±1		
	Potion	3.3±0.94		
	Management	3.27±0.88		
	Logistics	3.99±1		
	Other	3.55±1		
Comprehensive satisfaction	Doctor	2.8±0.77	43.031	0.000*
	Nursing	3.37±0.7		
	Medical Skill	3.73±0.9		
	Potion	3.59±0.86		
	Management	3.36±0.86		
	Logistics	4.12±1		
	Other	4.03±1		

(6) Groups with different job titles

The one-way analysis of job title and salary satisfaction is shown in Table 9 (a is F value, b is H value, and * denotes significance at the 5% threshold). In the examination of variance (ANOVA) between the title factor and satisfaction with performance allocation and composite satisfaction, the difference between public hospital employees with different titles reached statistical significance (P<0.05). In terms of performance allocation satisfaction, those without titles were more satisfied than those with titles. In terms of comprehensive satisfaction, the satisfaction of those with full senior titles was higher than those with other titles.

Table 9: Univariate analysis of professional title and salary satisfaction

Dimension	Group	Satisfaction score	H	P
Salary system	Primary	3.54±0.93	2.231[a]	0.073
	Intermediate	3.83±1		
	Subheight	3.68±1		
	Positive Height	3.87±0.93		
	Nothing	3.43±1		
Salary level	Primary	2.9±0.91	5.236[b]	0.036
	Intermediate	3.2±0.87		
	Subheight	3.26±0.96		
	Positive Height	3.42±1		
	Nothing	2.94±0.93		
Performance distribution	Primary	3.31±1	2.813[a]	0.032*
	Intermediate	3.22±0.88		
	Subheight	3.5±0.88		
	Positive Height	3.43±0.89		
	Nothing	4.01±1		
Compensation structure	Primary	3.12±0.86	2.096[a]	0.088
	Intermediate	3.36±0.87		
	Subheight	3.16±1		
	Positive Height	3.56±1		
	Nothing	3.3±0.96		
Overall satisfaction	Primary	3.31±0.86	2.451[a]	0.046*
	Intermediate	3.37±0.89		
	Subheight	3.1±0.89		
	Positive Height	3.33±1		
	Nothing	3.05±0.92		

4.2 Correlation analysis

In this study, Pearson's approach was applied to examine the inter-dimensional associations, with results presented in Table 10. Based on the magnitude of the inter-variable correlation coefficients tabulated therein, overall satisfaction is significantly and positively correlated with the five dimensions of pay satisfaction.

Table 10: Relevance

		Salary system	Salary level	Performance distribution	Compensation structure	Overall satisfaction
Salary system	Pearson correlation	1	0.331**	0.026	0.144	0.987**
	Sig.(Two-tailed		0	0.658	0.059	0
Salary level	Pearson correlation	0.331**	1	0.056	0.073	0.54**
	Sig.(Two-tailed	0		0.432	0.335	0
Performance distribution	Pearson correlation	0.026	0.056	1	0.223**	0.041
	Sig.(Two-tailed	0.658	0.432		0.001	0.663
Compensation structure	Pearson correlation	0.144	0.073	0.223**	1	0.195*
	Sig.(Two-tailed	0.059	0.335	0.001		0.013
Overall satisfaction	Pearson correlation	0.987**	0.54**	0.041	0.195*	1
	Sig.(Two-tailed	0	0	0.663	0.013	

4.3 Regression analysis

(1) The experiment was tested by linear relationship test, and it was concluded that a linear association exists between the overall contentment level of the dependent variable and all five dimensions of the independent variable.

(2) Dependent Variable Independence Test Usually, Durbin-Watson test is used and the DW value of this study is 2.124, which proves that the dependent variable is independent.

(3) Independent variable independence test

Usually, multiple covariance test is employed to assess the independence of predictor variables; in this study, the VIF values are less than 10, confirming the absence of multicollinearity among independent variables, with the covariance test results are shown in Table 11.

Table 11: Collinearity test results

		Collinearity statistics	
Model		Tolerance	VIF
1	(Constant)	0.88	1.174
	Salary system	0.876	1.167
	Salary level	0.995	1.001
	Performance distribution	0.947	1.098
	Compensation structure	0.942	1.087
	Comprehensive satisfaction	0.983	1.024

(4) Standardized residual normality test

The histogram shows that the residuals follow a normal distribution and the histogram is shown in Figure 3.

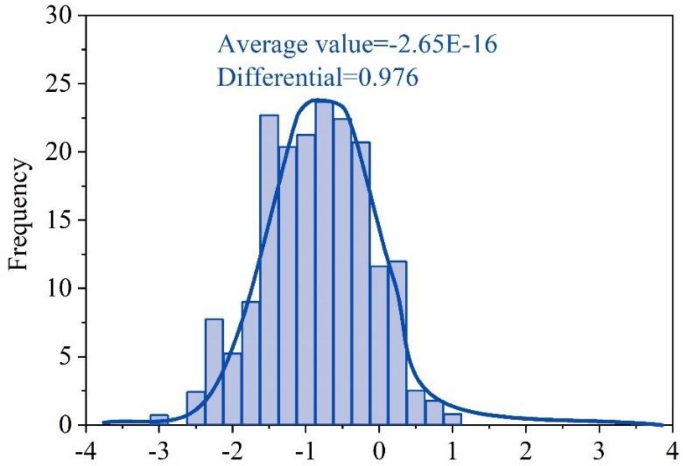

Figure 3: Histogram

As illustrated by the normal P-P plot, all data points cluster in close proximity to the diagonal line, suggesting that the regression residuals conform approximately to a normal distribution. The P-P plot of the standardized residuals of the dependent variable is presented in Figure 4.

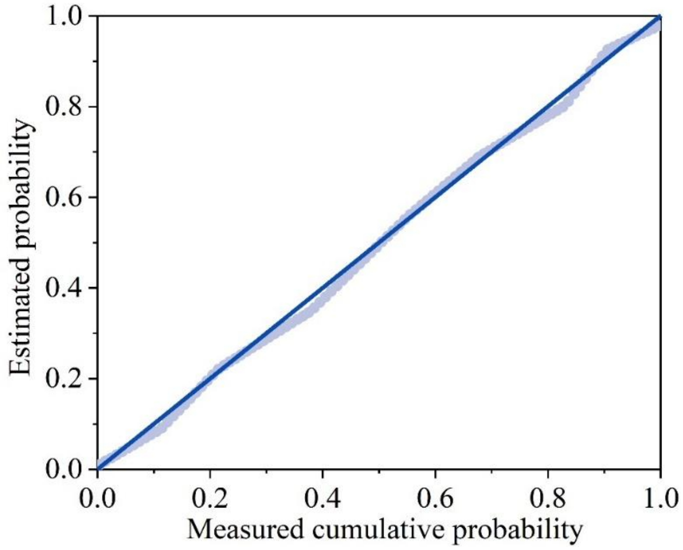

Figure 4: Standardized residual P-P plot of the dependent variable

(5) Variance Alignment Test

The scatter plot between the predicted values of the dependent variable and the standardized residuals confirms that the regression model meets the homoscedasticity assumption, with the scatter plot of predicted values against standardized residuals presented in Figure 5.

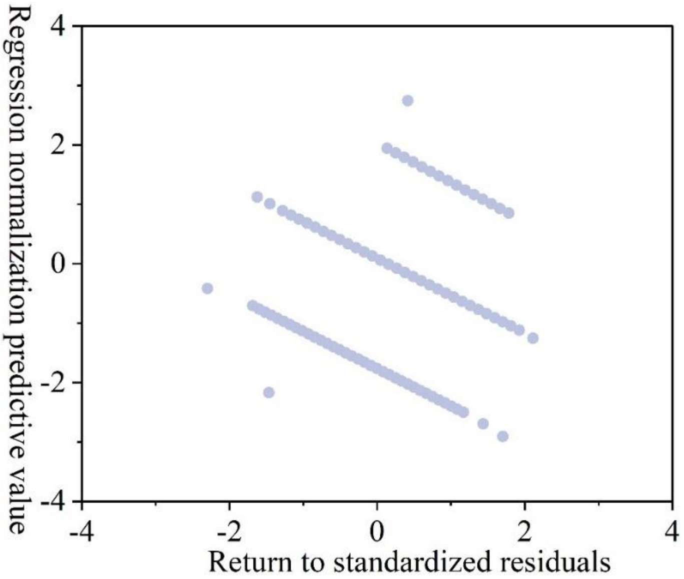

Figure 5: Predicted value vs. standardized residual scatter plot of the dependent variable

(6) Regression analysis model construction

The ANOVA output is presented in Table 12 (a denotes the dependent variable, b denotes the predictor variable). Based on the ANOVA results, the F-statistic reached 63.578, with a significance level below 0.001, confirming that the model achieves statistical significance and that a meaningful linear relationship exists between the outcome and predictor variables.

Table 12: ANOVA

Model		Sum of squared deviations	Degrees of freedom	Mean square	F	Significance
1	Return	50.48	7	8.531	63.578	0.000^b
	Residual	18.267	145	0.132		
	In total	68.853	153			

Table 13: Coefficient

		Unstandardized coefficient		Standardization coefficient		
Model		B	Standard error	Beta	t	Significance
1	(Constant)	-2.036	0.362		-6.521	0.000
	Salary system(X_1)	0.521	0.049	0.522	11.14	0.000
	Salary level(X_2)	0.291	0.039	0.379	7.939	0.000
	Performance distribution(X_3)	0.227	0.069	0.158	4.329	0.000
	Compensation structure(X_4)	0.179	0.071	0.127	3.099	0.000

The regression coefficients of salary satisfaction are shown in Table 13. From the table of regression coefficients table, it can be seen that the regression coefficients of the five independent variables such as strategic salary P-value is less than 0.05, there is significance and can be included in the regression equation. According to the multiple linear regression equation to get the linear regression equation of the salary distribution of public hospital health care workers is:

Y overall satisfaction$=-2.036+0.521\times X_1+0.291\times X_2+0.227\times X_3+0.179\times X_4$.

This regression analysis model can be used for pay satisfaction prediction. By examining the magnitude of the estimated coefficients presented in the table, the predictor variables can be ranked in descending order of their impact on the outcome variable as follows: remuneration framework, comprehensive contentment, pay grade, performance allocation, and pay structure — reflecting a hierarchy from greatest to least explanatory contribution to the dependent variable. Notably, the coefficient associated with the remuneration framework stands at 0.521, the highest of all predictors, demonstrating that it exerts the most pronounced effect on overall compensation contentment; each one-unit increment in the remuneration framework predictor is associated with an average rise of 0.521 units in overall contentment.

5 Conclusion

In this paper, we developed a compensation allocation scheme grounded in the RBRVS methodology, with nursing personnel from a top-tier public hospital in province A serving as the research subjects. Data were gathered through questionnaire distribution and retrieval, and both determinants of compensation contentment and their interrelationships were examined through correlation and regression approaches. The key findings are as follows:

(1) Differences in satisfaction with salary distribution among public hospital employees of different genders, ages, civil statuses, hospital grades, occupational categories, and professional titles reached statistical significance at $P < 0.05$, which means that employees of public hospitals of different genders, ages, marital statuses, hospital grades, job categories, and job titles have an impact on satisfaction with salary distribution.

(2) The order of the four dimensions of satisfaction from strongest to weakest is: compensation system, comprehensive satisfaction, pay level, performance distribution, and pay structure. Multiple linear regression equations get the linear regression equation of salary distribution of medical staff in public hospitals as follows: Y overall satisfaction$=-2.036+0.521\times X_1+0.291\times X_2+0.227\times X_3+0.179\times X_4$. The regression coefficient of the salary system is the largest of 0.521, which means that the remuneration framework exerts the greatest influence on overall compensation contentment.

To sum up, if public companies want to enhance the compensation allocation model for healthcare and nursing personnel in public hospitals and boost their compensation contentment, they should firstly pay attention to the satisfaction in the aspects of salary system and overall satisfaction, which are inclined to the strategic and institutional level, and secondly they should pay attention to the satisfaction in the aspects of pay grade, performance-based incentives, and pay structure, which are inclined to the operational and application level.

About the Author

Xu Chen (born December 1989), female, Han, from Fangshan District, Beijing, holds a bachelor's degree and is certified as an economist. Her research focuses on compensation-performance mechanisms, incentive systems, talent development models, and related fields.

References

[1] Gao, T., & Gurd, B. (2015). Meeting the challenge in performance management: the

diffusion and implementation of the balanced scorecard in Chinese hospitals. Health policy and planning, 30(2), 234-241.

[2] Jiang, S., Wu, W. M., & Fang, P. (2016). Evaluating the effectiveness of public hospital reform from the perspective of efficiency and quality in Guangxi, China. SpringerPlus, 5(1), 1922.

[3] Xiong, J., He, Z., Deng, Y., Zhang, M., & Zhang, Z. (2017). Quality management practices and their effects on the performance of public hospitals. International Journal of Quality and Service Sciences, 9(3/4), 383-401.

[4] Shamki, D., & Al Shehemi, A. (2019). The influence of the performance evaluation on salary. Finance, Accounting and Business Analysis (FABA), 1(1), 22-32.

[5] Spano, A., & Monfardini, P. (2018). Performance-related payments in local governments: Do they improve performance or only increase salary?. International Journal of Public Administration, 41(4), 321-334.

[6] Mendelson, A., Kondo, K., Damberg, C., Low, A., Motúapuaka, M., Freeman, M., ... & Kansagara, D. (2017). The effects of pay-for-performance programs on health, health care use, and processes of care: a systematic review. Annals of internal medicine, 166(5), 341-353.

[7] Chen, Q., Liang, M., Li, Y., Guo, J., Fei, D., Wang, L., ... & Zhang, Z. (2020). Mental health care for medical staff in China during the COVID-19 outbreak. The Lancet Psychiatry, 7(4), e15-e16.

[8] Qi, B., Wang, J., Ji, M., Xu, S., Li, J., & Shi, C. (2019, December). Design of the Management System for Salary Diagnosis and Optimization of Medical Staff in Shaanxi Public Hospitals of Traditional Chinese Medicine. In International conference on Big Data Analytics for Cyber-Physical-Systems (pp. 1733-1739). Singapore: Springer Singapore.

[9] ZHANG, X., Dongmei, X. I. E., Wen, C. H. E. N., Yi, Y. A. N. G., Lei, L. U. O., Yashu, R. A. O., ... & Tao, W. U. (2023). Analysis of typical experiences of public hospital salary system reform in Sichuan province. Chinese Journal of Hospital Administration, 102-107.

[10] Wahyuhadi, J., Hidayah, N., & Aini, Q. (2023). Remuneration, job satisfaction, and performance of health workers during the COVID-19 pandemic period at the Dr. Soetomo hospital Surabaya, Indonesia. Psychology Research and Behavior Management, 701-711.

[11] Yingqian, L., & Gumban, G. G. (2024). Public hospital financial performance and salary incentive mechanism: An exploratory sequential mixed method design. Central Philippine University Multidisciplinary Research Journal, 4(2), 172-190.

[12] Fatimah, F., Effendy, I., & Asriwati, A. (2025). Evaluation of the Implementation of Salary Payment in Improving the Performance of Honorary Workers at the Aceh Singkil Hospital. PROMOTOR, 8(1), 109-113.

[13] Quentin, W., Geissler, A., Wittenbecher, F., Ballinger, G., Berenson, R., Bloor, K., ... & Busse, R. (2018). Paying hospital specialists: Experiences and lessons from eight high-

income countries. Health Policy, 122(5), 473-484.

[14] Zhao, Y., Zhou, Z., Zhai, X., Liu, G., Wang, Z., & Deng, Q. (2025). Did the reform of the public hospitals' pay system increase the physicians' pay in China? A cross-sectional study. Frontiers in Public Health, 13, 1555819.

[15] Ghaedi, H., Dost, E. R., Ghanei, M., Razeghi, A., Kalani, N., & Akbari, H. (2018). A cross-sectional descriptive study on performance-based payment and the respective satisfaction on diagnosis, therapeutic and support-staffs of Jahrom hospitals. Ambient Sci, 5, 84-9.

[16] Jabbari, A., Shaarbafchi Zadeh, N., & Maddahian, B. (2019). Identifying executive challenges of performance-based payment from medical and educational hospitals administrators' perspective and offering solutions in Isfahan (2018). Evidence based health policy, management and economics, 3(2), 121-130.

[17] Aghajani, M. H., Manavi, S., Maher, A., Rafiei, S., Ayoubian, A., Shahrami, A., ... & Maziar, P. (2021). Pay for performance in hospital management: A case study. International Journal of Healthcare Management, 14(2), 484-490.

[18] Wang, L., Huang, R., Ding, S., Li, G., Wang, S., & Wang, J. (2021). Performance-based salary distribution ratio in clinical departments of public hospitals based on improved DEA method. Journal of Computational Methods in Science and Engineering, 21(6), 1747-1755.

[19] Eghbali, M. E., Pourasghari, H., Gorji, H. A., Martini, M., Arabloo, J., Behzadifar, M., & Aryankhesal, A. (2025). Performance-based payment systems for general practitioners and specialists in selected countries: A comparative study. Journal of Preventive Medicine and Hygiene, 66(1), E114-E125.