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Model of contracting with the indirect treatment paraclinical units of the social security organization

Modelo de contratación con las unidades paraclínicas de tratamiento indirecto de la organización de la seguridad social

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Abstract

This study aimed to develop a model for contracting with the indirect treatment paraclinical units of the social security organization. Using a mixed exploratory design, the research was conducted in two consecutive stages: qualitative and quantitative. Data were collected through questionnaires developed by the researchers based on the conceptual model and analyzed using AMOS software. Thematic analysis of the interviews identified 176 primary codes, which were refined into 78 initial codes, grouped into 26 main themes and 10 factors. These factors included demographics, economic considerations, acculturation, specialization, physical conditions, staff literacy and experience, performance management, marketing, customer satisfaction, and external influences. The 10 factors significantly influenced the contracting criteria of the indirect treatment paraclinical units of the social security organization. The results of the Friedman test indicated that demographic factors had the greatest impact, followed by external factors, economic factors, customer satisfaction, marketing, staff literacy and experience, cultural background, specialization, physical factors, and performance management. The proposed model proved to be an effective tool for contracting indirect treatment paraclinical units within the social security organization, offering a structured approach to improving the efficiency and effectiveness of service delivery.

Resumen

Este estudio tuvo como objetivo desarrollar un modelo para la contratación con las unidades paraclínicas de tratamiento indirecto de la organización de la seguridad social. Empleando un diseño exploratorio mixto, la investigación se llevó a cabo en dos etapas consecutivas: cualitativa y cuantitativa. Los datos se recopilaron mediante cuestionarios desarrollados por los investigadores basados en el modelo conceptual y se analizaron utilizando el software AMOS. El análisis temático de las entrevistas identificó 176 códigos primarios, que se refinaron en 78 códigos iniciales, agrupados en 26 temas principales y 10 factores. Estos factores incluyeron elementos demográficos, consideraciones económicas, culturización, especialización, condiciones físicas, alfabetización y experiencia del personal, gestión del rendimiento, marketing, satisfacción del cliente e influencias externas. Los 10 factores influyeron significativamente en los criterios de contratación de las unidades paraclínicas de tratamiento indirecto de la organización de la seguridad

Palabras clave:

Contratación,
tratamiento indirecto,
unidades paraclínicas,
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social. Los resultados de la prueba de Friedman indicaron que los factores demográficos tuvieron el mayor impacto, seguidos de los factores externos, los factores económicos, la satisfacción del cliente, el marketing, la alfabetización y experiencia del personal, la culturalización, la especialización, los factores físicos y la gestión del rendimiento. El modelo propuesto demostró ser una herramienta eficaz para la contratación de las unidades paraclínicas de tratamiento indirecto de la organización de la seguridad social, ofreciendo un enfoque estructurado para mejorar la eficiencia y la eficacia en la prestación de servicios.

Introduction

In a study titled "Designing a model for providing supplementary health insurance in the social security organization (SSO)", Karimi et al.[1] extracted data and concepts, and showed that a multi-dimensional model is necessary in this field. Mehdizadeh et al.[2] conducted a study titled "Investigating the underlying factors of the establishment of knowledge management in insurance organizations: case study in SSO". According to the results, organizational culture, employees, IT, organizational structure, strategy, and leadership affect the establishment of knowledge management. In a study titled "Performance evaluation of provincial units of SSO in indirect treatment sector using TOPSIS Method in 2017", Jahangiri & Jahangiri[3] suggested that all the units have a relatively favorable situation. The variables were evaluated by multivariate regression, indicating that the management model has an important contribution to this field. The results of a study titled "Measurement of efficiency of direct medical services affiliated with iranian SSO using data envelopment analysis in 2014" by Esmaili et al.[4] indicated that the average technical efficiency of the studied units, managerial efficiency, and the scale efficiency of the whole studied units are very favorable. In addition to introducing performance patterns for managers of the SSO, this study provides them with the possibility of more detailed planning for development and saving resources.

Boustani & Elisabetta[5] conducted a study titled "Smart insurance contracts shielding pandemic busi ness disruption in developing countries and block chain solution". The results showed that smart contracts and decentralized finance (DF) can be used as potential solutions to overcome the devaluation of the Lebanese currency and high insurance costs. According to the results of a study titled “Out-patient coverage: private sector insurance in India” by Gambhir et al.[6], out-patient coverage (OPD) is one of the important emerging trends in private sector health insurance.

OPD is emerging as a significant trend in private sector health insurance, requiring multidimensional management for its effective implementation. Organizations providing social services can adopt the indirect treatment method to establish and deliver services by adhering to regulatory criteria such as population density, availability of hospitals and medical service centers, and the presence of experienced medical personnel[7].

A study examining contracts with knowledge-based companies in the UK emphasizes that the licensing process for indirect treatment in medicine depends on three primary components: medical infrastructure, social structure, and the cultural compatibility of the host service center. Among these, the medical and health infrastructure is considered the most critical[8]. High-density medical services can be outsourced to low-density private sector areas, enabling the efficient delivery of healthcare to larger populations at a

lower cost. This strategy has been proposed in Turkey to address increasing government healthcare expenses, with an emphasis on expert medical personnel and robust infrastructure, including training, data protection, and patient support systems[9,10].

One of the critical challenges facing health policy makers is determining the scope of insurance package services. With finite resources and unlimited healthcare needs, prioritization is essential to bridge the gap between demand and available resources. Policymakers must adopt effective prioritization mechanisms, considering social values and national characteristics, to optimize the allocation of resources. A common strategy involves defining health service packages aligned with selected priorities.

In Iran, two primary health service packages are financed by the health system: The Basic health service package: covers 30-35 % of healthcare expenses and is fully government-funded.

The medical service package: Financed by insurance organizations under the Ministry of Cooperatives, Labor, and Social Welfare[11]. This study aimed was explore the criteria and components involved in contracting clinics and paraclinical units for the SSO indirect treatment services.

Materials and methods

This exploratory mixed-method study was conducted to develop a comprehensive model for contracting with the indirect treatment paraclinical units of the SSO. The research was carried out in two main stages: qualitative and quantitative, from January 2021 to December 2023, across various medical record offices and contracting committees in Iran.

Research location and duration. The study took place in multiple locations throughout Iran, involving 32 medical record offices and contracting committees. The research spanned from January 2021 to December 2023.

Study Design. A sequential exploratory mixed design was employed, consisting of two consecutive phases:

Step 1: Qualitative method (identification of dimensions and development of the model). i). *data collection*: Data were collected through in-depth and exploratory interviews with 11 scientific experts selected via purposive sampling. Interviews continued until theoretical saturation was achieved, meaning no new themes emerged. iii). *thematic analysis*: The interviews were analyzed using thematic analysis. Codes were extracted, categorized, and grouped into dimensions, components, and indicators. iv). *model proposal:* Based on the thematic analysis, a conceptual model was proposed, identifying 10 dimensions and 26 sub-themes.

Step 2: Quantitative method (model validation). i). *sample size calculation:* The second Cochran formula was used to determine the minimum sample size needed, resulting in 384 participants. A total of 385 questionnaires were distributed, and 329 completed questionnaires were collected initially. Redistribution continued until 385 analyzable responses were obtained. iii). *data collection:* Data were gathered using researcher-made questionnaires derived from the proposed model. iv). *data analysis*: Structural equation modeling (SEM) was performed using AMOS software to validate the model. Collinearity between variables was assessed to ensure no redundancy in the data.

Cochran formula for sample size determination. The sample size was calculated using Cochran's formula[12]:

Given the large population and its limited number, the calculated sample size was 384.16, forming the basis of the analysis.

$$n_0 = \frac{Z^2 \cdot p \cdot q}{e^2}$$

Where: n_0 is the sample size. Z is the Z-value (e.g., 1.96 for a 95 % confidence level). p is the estimated proportion of an attribute that is present in the population. q is 1−p1 - p1−p.e is the desired level of precision (margin of error).

Data collection tools. i). qualitative phase: Semi-structured interviews. ii). *quantitative phase*: Researcher-made questionnaires based on the proposed model.

The overall fit was assessed using the following indices of fit: chi-square, goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), comparative fix index (CFI) and root mean square error of approximation (RMSEA)

Results

Table 1 Demographic characteristics of respondents: distribution by gender, marital status, age, education level, and work experience

Variable	Group	Frequency	%
Gender	Female	188	48.8
	Male	197	51.2
Marital status	Single	95	24.7
	Married	290	75.3
Age	Less than 30 years old	64	16.6
	30 to 40 years old	180	46.8
	40 to 50 years old	99	25.7
	Above 50 years old	42	10.9
Education level	Associate degree	32	8.3
	Bachelor's degree	210	54.5
	Master's degree and above	143	37.2
	Total	385	100.0
Work experience	1 to 5 years	48	12.5
	6 to 10 years	90	23.4
	11 to 15 years	146	37.9
	Over 16 years	101	26.2
Total		**385**	**100.0**

The findings from the qualitative phase informed the development of a robust model, which was subsequently validated and refined through quantitative analysis, ensuring its applicability and effectiveness in real-world settings.

Findings of the qualitative section. Thematic analysis was employed in the qualitative section to analyze the interviews. All variables were extracted, and the codes of each theme were reviewed and analyzed. In the open coding phase, 176 primary codes were identified, from which 78 primary codes (sub-themes) were extracted based on initial analysis and grouped into 26 main themes and 10 dimensions.

Findings of the quantitative section.

Structural equation modeling (SEM). The Kolmogorov-Smirnov test was used to verify the normal distribution of variables. The significance level for all variables was above 0.05 %, indicating normal distribution and allowing the use of parametric tests.

Correlation analysis. To check for collinearity between variables, correlations were assessed. High collinearity (above 0.9) can indicate redundant information. The analysis revealed that all correlations were below 0.8, indicating no significant collinearity.

Fit indices of the SEM. The fit indices for the structural equation modeling (SEM) indicate that the model has a very good fit. The values are as follows:

Results of t-test for relationships. The hypotheses

were tested by path coefficients and t-values. If the t-value for a path is greater than 1.96, the path is significant, confirming the desired hypothesis at the 0.05 error level.

Table 2 Identified dimensions and sub-themes

Axial theme	Row	Main theme	Sub-theme	Repetition of themes
Demographic factors	1	Center-to-population ratio	Spatial range, Population density, Age structure	13, 11, 8
	2	Cooperation of relevant organizations	Structural connection, Number of related organizations, Proper communication and coordination	5, 4, 4
	3	Facilities associated with the region	Building's location, Accessibility, Collaborating organizations	6, 7, 4
	4	Decentralization	Extent of centers, Creating access in all regions, Segregated management	5, 7, 4
Economic factors	5	Budgeting	Financial support, Budget allocation, Allocation of financial resources	4, 9, 5
	6	Cost control	Cost management, Project management	6, 3
	7	Examination of the performance of centers by type	Determining the policy model, Organizational guidelines	7, 5
Culturalization	8	Appropriate communication	Structural relations, Managerial relations, Executive relations	6, 8, 5
	9	The right legislation	Policymaking, Executive documents, Structural considerations, Separation policies, Explanation of goals	11, 7, 5, 6, 6
Specialization	10	Awareness and separation of responsibilities	Role differentiation in the system, Communication and introduction, Specificity of role and structure	5, 5, 6
	11	Presence of physicians and specialists	Number of GPs, Number of specialist physicians, Sufficient staff, Appropriate service	8, 6, 5, 6
Physical factors	12	Standard definition	Organizational standards, Performance standards, Macro standards, Systematic comprehensive criteria	9, 5, 6, 5
	13	Clinic appearance	Exterior of the building, Interior of the building, Modernism	4, 5, 4
	14	Relative size of the structure	Extent, Public service center, Service center of special departments	6, 5, 4
	15	Structural conditions	Organizational relations, Connections, Situational-organizational atmosphere	7, 6, 7
	16	Physical conditions	Physical conditions, Daily facilities, Overnight facilities	9, 5, 5
Personnel literacy and experience	17	Academic literacy	Educational expertise, Academic expertise, Educational and professional knowledge	6, 6, 5
	18	Holding training courses	In-service training, Skill training, Periodic training of systematic discipline	7, 5, 4
Performance management	19	Organizational management	Strategic management, HRM, System management	7, 5, 4
Marketing	20	Indirect marketing	Marketing based on quality measurement conditions, Marketing based on service improvement and resulting ranking in brand and organization strength	5, 3
Customer satisfaction	21	Interrelationships and feedback	System communication, Condition feedback, Explaining the interaction pattern	7, 4, 4
	22	Design of the evaluation system	Evaluation system, Quality assurance system, Existing and desirable status matching system	5, 8, 3
External factors	23	Number of referrals	Number of periodic admissions, young or old society and adapting according to needs	7, 4
	24	Mechanization and electronicization	Equipment conditions, electronization pattern, E-government and related aspects	9, 6, 5
	25	Determining the quality level	Quality assessment, Quality assurance, Quality speed	8, 5, 6
	26	Ranking	Prioritization, Scoring, Criterion development	6, 7, 7

Table 3 Fit indices of the SEM

Statistical Indices	$\chi 2$	AGFI	GFI	CFI	RMSEA
Fit Value	502.88	.93	.92	.92	.036

Ranking the factors affecting the criteria for contracting with the indirect treatment paraclinical units of the SSO. The factors were ranked using the Friedman test. The results, which showed a significance

level of less than 0.01, suggested that the ranking of the factors was significant at the 99 % confidence level.

Proposed model. The proposed model is shown in standard and significance modes. The significance of model relationships is analyzed using significance coefficients (t-value). Since the coefficients were above 0.3, all the relationships were significant.

Model fit indices. The fit indices indicate that the model has a very good fit, with all constructs being significant and conforming to the model. The indices are as follows: AGFI: 0.93, GFI: 0.92, CFI: 0.92, RMSEA: 0.036

Table 4 The results of t-test for the relationships

Hypothesis	Variable	Path Coefficient (β)	t-value	Ranking Based on Impact Factor	Result
1	Demographic factors	.51	14.23	1	Confirmed
2	Economic factors	.46	10.85	3	Confirmed
3	Culturalization	.39	7.91	7	Confirmed
4	Specialization	.35	6.10	8	Confirmed
5	Physical factors	.33	4.83	9	Confirmed
6	Personnel literacy and experience	.40	8.28	6	Confirmed
7	Performance management	.32	4.27	10	Confirmed
8	Marketing	.42	9.15	5	Confirmed
9	Customer satisfaction	.43	9.94	4	Confirmed
10	External factors	.49	12.89	2	Confirmed

Table 5 Ranking the factors affecting the criteria for contracting with the indirect treatment paraclinical units of the SSO

Dimensions	Average Rank	Rank
Demographic factors	4.14	1
Economic factors	3.81	3
Culturalization	1.89	7
Specialization	1.81	8
Physical factors	1.66	9
Personnel literacy and experience	2.45	6
Performance management	1.47	10
Marketing	2.44	5
Customer satisfaction	3.28	4
External factors	3.98	2

Discussion

The importance of this study lies in its potential to significantly improve the efficiency and effectiveness of contracting with indirect treatment paraclinical units by the SSO. The SSO plays a crucial role in providing healthcare services in Iran, and optimizing its contracting processes can lead to better service delivery, cost savings, and increased patient satisfaction.

Relevance and implications of the study. The healthcare system is a critical component of any society, and ensuring its efficient operation is paramount. In Iran, the SSO is responsible for a substan-

tial portion of healthcare delivery through both direct and indirect services. Given the increasing costs and the growing demand for healthcare services, it is essential to adopt strategies that maximize resource utilization and service quality. The proposed model for contracting with paraclinical units addresses these needs by providing a structured and evidence-based framework.

Demographic factors. Demographic factors were found to be the most influential in determining contracting criteria. This is consistent with previous research that highlights the importance of demographic considerations in healthcare planning and service delivery. The center-to-population ratio, population density, and age structure are critical for ensuring that healthcare services are accessible and adequately distributed.

Economic factors, such as budgeting and cost control, play a pivotal role in ensuring the sustainability of healthcare systems. Efficient allocation of financial resources and effective financial oversight are essential to improve healthcare outcomes. Studies indicate that sustainable financing strategies, such as comprehensive health insurance and equitable resource allocation, enhance health system sustainability, especially during economic crises[13].

Culturalization, involving culturally sensitive communication and policy implementation, is vital for patient engagement and compliance. Research highlights that healthcare policies aligned with cultural contexts and organizational structures enhance patient satisfaction and system efficiency[14].

The presence of trained and experienced medical professionals is critical for delivering high-quality healthcare. Training and continuous professional development ensure that healthcare providers remain competent and responsive to evolving system needs. Studies on healthcare contracting in large-scale systems emphasize the role of trained personnel in improving service delivery performance[15].

The physical and structural conditions of healthcare facilities also significantly impact patient satisfaction. Well-maintained infrastructure and facilities contribute to higher patient satisfaction and improved health outcomes. Sustainable service quality in healthcare depends on maintaining cleanliness, reducing waste, and managing resources effectively[16].

Performance management and marketing strategies, such as indirect quality-based marketing, are critical for enhancing healthcare system credibility. Studies have shown that effective performance management ensures quality standards, while strategic marketing improves the reputation of healthcare organizations[17]. Customer satisfaction, a key indicator of healthcare quality, is influenced by both internal and external factors. Integrating technology into - healthcare services, such as electronic record systems, has proven to improve efficiency, streamline processes, and increase satisfaction levels[18].

Broader context and future directions. This research contributes to the growing body of knowledge on healthcare management and policy by providing a model for contracting with paraclinical units. The findings emphasize the significance of integrating economic, cultural, structural, and technological factors into healthcare management practices. Future studies could further explore the implementation of such models in different settings and assess their impact on healthcare outcomes. Additionally, investigating the potential of emerging technologies, such as artificial intelligence and telemedicine, could optimize healthcare contracting and delivery processes[19].

In conclusion, the proposed framework for contracting paraclinical units underscores the importance of demographic, economic, cultural, and structural con-

siderations. By leveraging these insights, healthcare systems can enhance resource utilization, improve service quality, and increase patient satisfaction. Continuous adaptation of healthcare policies and practices is essential to meet the dynamic needs of societies. They suggested that indirect treatment has many components and mentioned the number of physicians, the appearance of treatment centers, and psychological principles as criteria for contracting with private treatment centers by the public sector. The results indicated that all the above factors affected the development of the indirect treatment. The alignment of the findings with other studies indicates that the set of relevant factors at various levels should be formed and that a multi-layered and structural view should be formulated in this field, and the principles related to it are derived from a multi-dimensional view of physical conditions such as population ratio and productivity rate of the relative percentage of the population. Paying attention to business criteria such as marketing and the advantage model provides the possibility of realization and structuring in this field. Besides, the management conditions and the ruling model are multi-dimensional and supportive structures that make the implementation and operationalization of this structure a reality. According to the effect of population density and physical conditions on the criteria for contracting with indirect treatment paraclinical units of the SSO, this organization is recommended to prepare a detailed report on demographic areas, distance from similar organizations, etc., in the form of a specific model so that the fields of application and specialization in this field can be provided. Moreover, the relevant organizations are recommended to use detailed knowledge management-based instructions and the relevant model in recruiting and hiring employees. Since marketing based on quality assessment conditions is one of the criteria for contracting with indirect treatment paraclinical units of the SSO, it is recommended to develop a practical marketing model based on new marketing elements and tools. It should be noted that this research was done independently and was not under the financial support of an organization. In the context of the limitations of this research, the difference in attitude, expertise and socio-economic level of the participants is effective in providing answers to the research questions, and the researcher was not able to control all these cases.

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Conflicts of interest

The authors declare that there is no conflict of interests**.**

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Availability of data and materials

The datasets analyzed in this study are available upon reasonable request from the corresponding author.

Ethical considerations

All participants provided informed consent. Confidentiality and anonymity were strictly maintained throughout the study. Ethical guidelines for mixed research were followed diligently.

Research limitations

This study encountered several limitations that may have influenced the findings. First, the attitudes, expertise, and socio-economic diversity of participants posed challenges in achieving uniform responses. Second, the reliance on self-reported data in the quantitative phase may introduce bias. Lastly, logistical constraints in accessing some regions for data collection may have restricted a more comprehensive representation of the population. Despite these limitations, efforts were made to ensure the robustness.

Authors' contributions

Sina Salehi Darabi, led the study design, data collection, and manuscript drafting. *Mehrnush Jafari*, contributed to the thematic analysis, quantitative data validation, and critical revisions of the manuscript. *Seyed Mojtaba Hosseini*, provided expertise in healthcare management and supported the development of the conceptual model. *Khalil Alimohammadzadeh*, guided the structural equation modeling and data interpretation. *Ali Maher*, reviewed the findings and ensured alignment with healthcare policies and practices. All authors read and approved the final manuscript.

Consent for publication

Not applicable.

Use of artificial intelligence

We assume that the entire document was written based on ethical and professional criteria, and AI was not used to make the images or text.

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