# Identifying and priority setting indicators of integration and integrable units in hospitals of Tabriz University of Medical Sciences from the perspective of health experts

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**Original Article**

## Abstract

**BACKGROUND:** Hospitals face major challenges such as lack of resources, increase in costs, and particularly severe limitations by sanctions that lead to integration in hospitals. This study was conducted to identify and prioritize the indicators of integration and integrable hospital units based on the experts' perspective.

**METHODS:** The present study was a three phase qualitative, applied survey. The first phase included a review of the fundamental concepts. The second phase included three focus group discussions with presence of experts to identify necessary indicators for the implementation of integration strategy and the hospital units that can be integrated based on indicators. In the third phase, Delphi's questionnaire was prepared based on Likert's scale for prioritizing and choosing the indicators and hospital units.

**RESULTS:** 9 indicators and 29 hospital units were identified during focus group discussions. Consensus was achieved on 9 indicators and 23 units out of 29 units based on the three stages of Delphi's questionnaire. The most important indicators were cost and parallelism in tasks (consensus = 95.2%). Service availability and responsibility (consensus = 71.4%) were the least important indicators. The supporting units had the greatest potential (45.45% of total units) of merging. Emergency, inpatient wards, management, and chairmanship units were not candidates for integration according to the viewpoint of experts.

**CONCLUSIONS:** Integration will lead to efficiency in resources management, avoids parallelism in tasks, increases service availability, and reduces costs. Integration capability exists in many parts of the hospital; therefore, it can be used in the hospitals. Furthermore, it is necessary to define clear indicators for measuring the success of this strategy.

**KEYWORDS:** Hospitals, Merger, Integration, Delphi Technique, Focus Group Discussion, Resource Management

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## Introduction

The hospital is the most important provider of health care and it has a key role in restoring the health of patients, medical research, and education.[1] This organization consumes a large portion of the health budget in each country; therefore, it is necessary to pay attention to its performance

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and costs.[2] This issue has a vital importance, particularly for our country which faces severe sanctions and restrictions over production and importation of equipment, supplies, and even essential drugs.

The rate of operating costs and inefficiencies in hospitals has increased the uncertainty about the optimal use of resources in hospitals.[3] Very large sums are spent on construction, maintenance, and rehabilitation in hospitals around the world annually; however, there are few relevant evidences expected benefits are increase satisfaction and efficiency and effectiveness.[4] Greese has estimated that in public hospitals 44% of none personnel costs can be saved via management of inefficient processes.[5] Poor management results in the wasting of hospital resources. More resources will be available in order to provide more services or improve access to hospital services by reducing or avoiding of wastes.[6] Asefzadeh and Rezapour stated that although the sole economic evaluation of health care services is not appropriate, it will be very beneficial to evaluate the efficiency and optimal use of resources.[7]

Integration is one of the methods of overcoming the flaws and shortcomings of the hospital management, and appropriate management of resources which has been used by different countries. Merging of 90 hospitals in the US in 1995-2002, integration of 3 regional CSR (Central Sterilization Room) centers to one equipped center in Austria, merging of 3 hospital libraries and the School of Nursing library in New Jersey, integration of treatment wards providing similar services in Tehran's Sina Hospital, integration of 9 general network labs into a single basic unit, and merging of 2 health centers as an independent health center in Tabriz are local and foreign experiences ofmerging.[5,8-12]

Integration can be a good strategy for downsizing the executive branch of the government in different parts including hospitals in Iran. It is in accordance with implementation of the 44th article of the constitution and the fourth and fifth National Development Plan which is particularly emphasized by the supreme leader on resistant economy and relying on local resources and investing. However, applying the new mechanism requires the assessment of the health system and adaptation to local conditions. Such reforms cannot be followed by a single universal or even a regional formula.[13] Therefore, this study was implemented to identify and prioritize the indicators for the implementation of integration and integrable hospital units based on the viewpoints of the health experts.

## Methods

The present study was a qualitative, applied study which was conducted in three stages. The first stage consisted of a survey of principles, theoretical concepts, collecting the lists of integrable hospital units, and essential indicators for implementation of this strategy. Considered indicators included the factors that were affected by merging and were measured before and after implementation of the integration program to check the success rate in this study. The primary framework for the focus group discussions was created based on the results of this stage.

The second phase of the study was data collection among 20 specialists including hospital administrators, hospital affairs experts, experts of the treatment deputy of the university, experts of the development and resource management affairs, health care management masters, PhD students, and masters of health care management research center. The majority of experts had scientific and administrative experiences about hospital units' merging. Data were collected through focus group discussions. The approach of study was interpretive phenomenology, since group dynamics increases the quality and quantity of information.[14] This approach basically includes interpretation of phenomena which have been written.[14] Participants were

selected based on purposive sampling. This sampling was continued until information saturation and there were no repetitions. In total, 3 focus group discussions were held. Each session lasted 60 to 90 minutes.

All the focus group discussions were recorded, typed, and analyzed using a thematic analysis. The recorded information were listened several times and adapted with researcher manuscripts. Then, all texts were read for understanding and extracting concepts. Respondent validation was used in order to increase consistency and integrity of information. Thus, the researchers reviewed and interpreted the summary of notes, then returned them to participants.[14] At the end of focus group discussions the list was prepared based on a set of considered indicators for integration and the integrable hospital units.

In the third stage, the Delphi technique was used to determine the priority for the considered indicators for integration and integrable hospital services. The Delphi technique is known as an effective method to achieve consensus or to predict future events.[15] This technique has been defined as "a group method by questionnaire to obtain experts opinions". The obtained information is used for later stages. This process was continued to achieve consensus; sending the questionnaire to experts and collecting comments from experts which was conducted in at least 2 or 3 steps.[16,17] Consensus is defined as agreement about comments and options or concepts that are classified in score or grade form.[18]

In this technique, the questionnaire was designed on a Likert scale with response options of very high (1), high (2), no idea (3), low (4) and none.[5] It was decided that the indicators and units with 15% agreement be added to the questionnaire in the next Delphi round. Twenty four health experts were selected based on purposive sampling, including hospital administrators, hospital affairs experts, experts of the treatment deputy of the university, experts of the development and resource management affairs deputy, health care management masters, PhD students, and masters of health care management research center. Most of the experts had scientific and administrative experiences in integration. Before sending the questionnaire, researchers asked 5 experts to study and respond to the questionnaire in order to identify ambiguities and to estimate the required time to complete the questionnaire.

The Delphi technique was continued for three stages. Collected data from the first stage of Delphi were analyzed by SPSS for Windows (version 13; SPSS Inc., Chicago, IL, USA), to summarize descriptive statistics. Indicators and units with average consensus higher than 60% were selected. Indicators and units with an average of less than 30% were eliminated. Indicators and units with the average agreement between 30 to 60% for the second stage of Delphi were selected. The same stages were done in the second Delphi stage. It should be noted that a standard level for the consensus is not available. However, the results of the different studies have demonstrated that the range was between 51 to 100%.[19] At the end of the second stage of Delphi, the list of considered indicators and integrable units (based on priority) was achieved. This list was given to 10 experts to identify eventual inconsistencies in the third Delphi stage. All stages of the study are shown in figure 1.

## Results

Three focus group discussions were held with 17 (85%) male and 3 (15%) female participants. The age categories of participants were, 20-29 years old (n = 3), 30-39 years old (n = 4), 40-49 years old (n = 12), and 50 years old and older (n = 1). The expertise of participants were, PhD of health care management (n = 5), general practitioner (n = 10), and senior nurse (n = 5). In total, 9 indicators and 29 hospital units were proposed in sessions and were entered in the Delphi questionnaire.

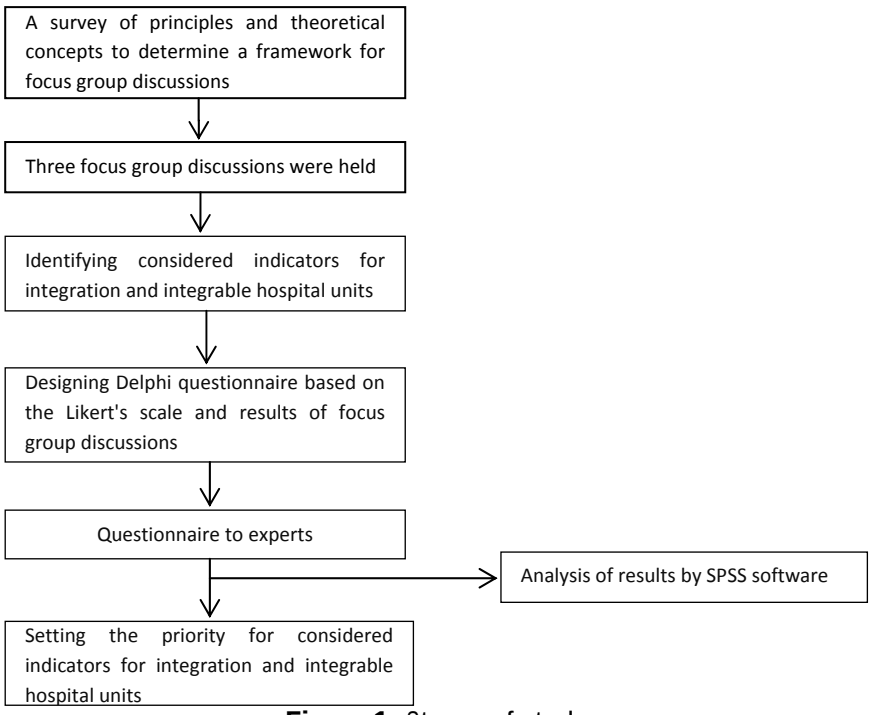


**Figure 1.** Stages of study

The 9 indicators which were included consisted of cost, quality, control power, responsibility, stakeholder satisfaction, staff workload, service availability, effectiveness, and parallelism. The 29 hospital units consisted of management, chairmanship, staffing, secretariat, finance, admission, discharge, medical records, pharmacy, laboratory, ultrasound, x-ray, CT scan, MRI, CSR, physical therapy, echocardiography, Laundry, storage, phone center, vehicles unit, decontamination staff, nutrition, guarding, repairs, waste disposal, emergency clinics, and inpatient wards. The questionnaire was sent to 24 experts who were responded to by 21 respondents (87.5% response rate). Information about experts is presented in table 1.

The consensus was achieved on all 9 indicators in the first step of Delphi (consensus about all indicators was high and very high, and more than 60%). The most important indicators were cost and parallelism (consensus = 95.20%), and service availability and responsibility (consensus = 71.40%) were the least important indicators.

The percentage of agreement and priority are presented in table 2.

The consensus was achieved on 23 units of the total 29 units (consensus = 75.86%). 23 units included 10 supporting units (decontamination staff, laundry, nutrition, repairs, waste disposal, decontamination staff, CSR, phone center, guarding, and storage), and 8 paraclinical units (pharmacy, laboratory, ultrasound, radiology, CT scans, MRI, physical therapy, and echocardiography). Other units were management and chairmanship units, financial unit, and emergency and inpatient wards.

Thirteen units (54.54% of total units) achieved agreement in the first round of Delphi. Ten units (45.46% of total units) achieved agreement in the second round of Delphi. The consensuses about 19 units were high and very high (82.60% of total units), and consensuses about 4 units were none and low (17.39% of total units). Supporting units (43.48% of total units) had the greatest potential for integration.

The vehicle unit (consensus = 90.5%) was the first option to merge, and CT scan and

**Table 1.** Characteristics of Delphi participants

| Variables | | Number | Percentage |
|---|---|---|---|
| Sex | Male | 15 | 71.33 |
| | Female | 6 | 28.57 |
| | No response | 0 | 0.00 |
| Age (year) | 20-29 | 4 | 19.05 |
| | 30-39 | 5 | 28.80 |
| | 40-49 | 10 | 47.62 |
| | 50 and older | 1 | 4.76 |
| | No response | 1 | 4.76 |
| Experiences (year) | < 20 | 4 | 19.05 |
| | Between 10-20 | 12 | 52.15 |
| | Up to 20 | 5 | 28.80 |
| | No response | 0 | 0.00 |
| Field | Hospital administrators | 4 | 19.05 |
| | Hospital affairs experts | 2 | 9.52 |
| | Experts of the treatment deputy of the university, and Experts of the development and resource management affairs deputy | 6 | 28.58 |
| | Health care management masters | 4 | 19.05 |
| | PhD students of health care management | 3 | 14.28 |
| | Masters of health care management research center | 2 | 9.52 |
| Education | PhD | 9 | 42.58 |
| | MSc | 8 | 38.90 |
| | BSc | 7 | 16.09 |
| Administrative experiences about merging | Yes | 13 | 61.90 |
| | No | 7 | 33.34 |
| | No response | 1 | 4.76 |

**Table 2.** Percentage of agreement and priority about indicators

| Indicator / Agreement level | Very high | High | No comment | Low | None | No response | Percentage | Priority |
|---|---|---|---|---|---|---|---|---|
| Cost | 13 | 7 | 0 | 0 | 0 | 1 | 95.2 | 1 |
| Quality | 11 | 7 | 0 | 1 | 1 | 1 | 85.7 | 2 |
| Control power | 7 | 9 | 0 | 3 | 1 | 1 | 76.2 | 4 |
| Responsibility | 7 | 8 | 0 | 3 | 1 | 2 | 71.4 | 6 |
| Stakeholder satisfaction | 6 | 10 | 2 | 0 | 2 | 1 | 76.2 | 4 |
| Workload | 6 | 9 | 0 | 4 | 0 | 2 | 71.5 | 5 |
| Service availability | 4 | 11 | 0 | 3 | 0 | 3 | 71.4 | 6 |
| Parallelism | 16 | 4 | 0 | 0 | 0 | 1 | 95.2 | 1 |
| Effectiveness | 10 | 7 | 1 | 2 | 0 | 1 | 80.9 | 3 |

Very high and high scales and low and none scales have been integrated in this table

echocardiography units (consensus = 60.0%) had the least chance for integration. The results of 2 Delphi stages were given to 10 experts for final comments in the third stage of Delphi. They believed that the integration can occur in hospitals due to nearby hospitals of Tabriz University of Medical Sciences, underutilization of some hospital services and supplies, and use of computer technology in administrative and financial services. All results are presented in table 3.

## Discussion

Nine considered indicators for merging and 23 hospital units which can be merged were identified and classified after implementing study stages. Cost and parallelism were the highest considered indicators with 95.2%

**Table 3.** Percentage and priority of hospital units for integration

| Agreement level / Hospital unit | Very high | High | No comment | Low | None | No response | Consensus percentage | | Delphi 1 | Delphi 2 | Priority |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Very high and high | Low and none | | | |
| Management | 3 | 2 | 0 | 8 | 7 | 1 | - | 71.4 | * | - | - |
| Chairmanship | 2 | 1 | - | 6 | 11 | 1 | - | 81.0 | * | - | - |
| Finance affairs | 9 | 6 | 1 | 3 | 2 | 0 | 71.4 | - | * | - | 4 |
| Pharmacy | 8 | 6 | 0 | 3 | 4 | 0 | 66.4 | - | - | * | 6 |
| laboratory | 9 | 6 | 0 | 3 | 3 | 0 | 71.4 | - | - | * | 4 |
| Ultrasound | 9 | 6 | 0 | 4 | 2 | 0 | 71.4 | - | - | * | 4 |
| Radiology | 9 | 6 | 0 | 3 | 2 | 1 | 71.4 | - | - | * | 4 |
| CT scan | 7 | 5 | 2 | 4 | 2 | 1 | 60.0 | - | * | - | 8 |
| MRI | 8 | 6 | 2 | 3 | 2 | 0 | 66.7 | - | * | - | 5 |
| Physical therapy | 7 | 6 | 2 | 2 | 3 | 1 | 61.9 | - | * | - | 7 |
| Ecocardiogherapy | 4 | 8 | 1 | 4 | 3 | 1 | 60.0 | - | * | - | 8 |
| Laundry | 10 | 5 | 2 | 1 | 3 | 0 | 71.4 | - | * | - | 4 |
| Repairs | 11 | 2 | 0 | 5 | 3 | 0 | 61.9 | - | - | * | 7 |
| Storage | 11 | 4 | 0 | 3 | 3 | 0 | 71.4 | - | - | * | 4 |
| Phone center | 9 | 7 | 0 | 3 | 1 | 1 | 76.2 | - | - | * | 3 |
| Vehicle unit | 13 | 6 | 0 | 1 | 1 | 0 | 90.5 | - | - | * | 1 |
| CSR | 8 | 9 | 0 | 2 | 1 | 1 | 81.0 | - | - | * | 2 |
| Nutrition | 8 | 6 | 3 | 0 | 4 | 0 | 66.7 | - | * | - | 5 |
| Guarding | 9 | 6 | 0 | 1 | 5 | 0 | 71.4 | - | - | * | 4 |
| Cleaners staff | 9 | 4 | 2 | 2 | 4 | 0 | 61.9 | - | * | - | 7 |
| Waste disposal | 9 | 4 | 4 | 1 | 3 | 0 | 61.9 | - | * | - | 7 |
| Emergency | 0 | 4 | 2 | 9 | 7 | 1 | - | 77.2 | * | - | - |
| Inpatient wards | 0 | 5 | 2 | 8 | 6 | 0 | - | 66.7 | * | - | - |

*Very high and high scales and low and none scales have been integrated in this table

agreement. Service availability and responsibility were the least important indicators with 71.40% agreement.

The results of the study by Tabibi et al. on integration of inpatient wards with similar services showed 40 to 50% decrease in current costs. Furthermore, a significant relationship between costs of labor, consumable products, and current and general costs of organizations before and after merging was observed ($P < 0.001$) which showed the significant impact of integration on the costs.[5] An important article in the New York Times indicated how mergers have helped hospitals to better manage costs through obtaining higher prices from insurance companies.[20] Dranove and Shanley hypothesize that local multi-hospital systems gain reputation benefits (especially about service quality) in comparison with nonsystem hospitals.[21] Krishnan and Krishnan assessed the impact of merging on hospitals in California, USA, in the 90's. In this study 113 hospitals (merging was conducted in 20 of them) were included. Integrated hospitals had 19% increase in revenue per patient; however, the cost per patient was unchanged, but total operating expenses were increased.[22] The results of the study by Jodati et al. about the consequences of merging at the Health Center of Tabriz indicated a slight increase in costs (current costs reached 69.93% in 2004 in comparison to 67.47% in 2003). On the other hand, the services focused on a building. The number of personnel was reduced from 248 to 148, and the quantity and quality of services also remained unchanged.[12] Comparison of the quality of hospital services before and after mergers in California (1992-1995) showed that recent merging had no measurable impact on inpatient mortality, but readmission rates and early discharge increased in some cases.[23]

According to the experts' views, the supporting and paraclinical departments had the most chances for integration, but consensus was not achieved on clinical wards. In the experience of downsizing in Tabriz`s comprehensive health network labs, the 9 medical labs were integrated into a single main unit. This merger resulted in improvement in the quality and quantity of services and cost saving in human resources, equipment, and physical environment.[11] The results of the study of Richardson's on integration of public and private labs in Ontario showed that service quality remained unchanged. This was reported to be due to the reduce in the number of the personnel responsible for supervision.[24] Regenberg et al. expressed in a short article that merging of 3 hospital libraries and the library of nursing schools in New Jersey increased the purchasing ability and also access to health information.[10] Kemp et al. showed 3 regional CSR centers integrated into one equipped center in Austria.[9]

## Conclusion

The results of this study and similar studies show that integration could lead to resource sharing, reduction of parallelism in tasks, reduction of costs, and increasing of service availability especially in the current economic crisis. Therefore, it is recommended to detect the hospital units which can be integrated within and among hospitals. Units such as CSR, vehicle, staffing, laboratory, and etcetera can be integrated and have profited from the advantages of optimal resources management.

### *Limitation*

Participants in the study had administrative posts and were busy. This was the most key problem during the study.

## Conflict of Interests

Authors have no conflict of interest.

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