Developing Accessibility Measurement Indicators for Iranian Health Centers

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Abstract: All over the world there is a pressure to improve the performance and it is not achievable unless we have a performance measurement tool. The purpose of study was to identify a list of indicators for accessibility measurement of Iranian health centers. The study was conducted in three stages: first, conducting review articles of the literature to identify different indicators for accessibility measurement; second, the Delphi process was used with participating eighteen experts in three round Delphi; third, Analytical Hierarchy Process method was used to give weights to each indicator. 31 indicators were identified in the literature review. The Delphi method reduced the list to eight indicators. This model can be used as a template for measuring accessibility to the health centers in developing countries.

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1. Introduction:

A network of primary health facilities has been constructed from Alma-Ata declaration, to improve the quality of the health care system [1]. In Iran the majority of rural and urban population receives primary health services from health centers. Formally each health center offers services to 12500 people. Visiting students, women health, vaccination, dental health and environment health are some of specific activities of health centers in Iran.

There are some challenges in performing a performance measurement system in health centers. Outcomes of health services can be achieve in future years so it is hard to measure the outcomes. Inefficacy of reliable data resources about health is another challenging item [2]. But there is evidence that health center factors partly explain access to health centers [3- 5].

Accessibility is an essential item in health center performance. Accessibility of health centers and providers for primary health services plays an important role in health system. Lack of access makes it difficult for people to engage in health prevention services, and this may result in higher cost of treatment [6]. Lack of access to primary health services is usually reported from rural areas of low and middle income countries [7]. In some studies it is emphasized that lack of access prevents receiving effective and qualitative care [6, 8-10].

In past several decades it has seen many efforts to develop and improve accessibility frameworks in different countries [11-13]. In these days more emphasis is on primary health center performance. Till now some authors have developed indicators and definitions for accessibility measurement [14].

To our knowledge there has not been previous study regarding the model for accessibility measurement of Iranian health centers. The main objective of this study was to develop a list of indicators to measure accessibility to Iranian health centers.

2.Methods:

This study was conducted in two stages: first, a systematic review of the literature was conducted to identify the list of accessibility measures; second, the Delphi process was used to select the appropriate accessibility indicators for Iranian health centers. Then Analytical Hierarchy Process (AHP) was used to give weights to indicators.

To reach consensus a Delphi procedure was used. For the questionnaire content the indicators collected from literature were as the basis for the questions, which the experts were then asked to proofread. We

designed an ascending assessment scale from 1 to 5: 1: Extremely disagree, 2: Disagree, 3: Neutral, 4: Agree, 5: Extremely agree. The numbers represented the degree of agreement towards the accessibility indicators by the experts.

To answer the questions of the questioner the experts must have sufficient professional knowledge, experience and wisdom. Therefore, this study selected experts with one of the following qualifications:

(1) A current or previous health center manager with at least 5 years of practical experience;

(2) A PhD degree of health services management and expertise-related experience;

(3) A professional and technical staff and 10 or more years of practical experience.

Based on the qualifications, 18 people were selected as experts for Delphi procedure. Each expert was asked to fill out the questionnaires. They could suggest any item related accessibility measurement that was not concluded the questioner. The answers were collected and analyzed by SPSS 19. For the first round of questionnaires in the survey, we issued a total of 18 questionnaires, and retrieved 18 questionnaires, for a return rate of 100%. We had this consequence with 2 other rounds. After retrieving each round of Delphi, data were analyzed and another questioner was designed for the next round. The analysis functions included averaging, standard deviation and t-test.

In this study we conducted a 3 round Delphi to select the indicators. After designing the first model due to the Delphi results, we sent back the model to the experts to confirm it. If two from third of the experts agreed to add or omit the indicators we consider it to develop the main model. It was done to check the reliability and validity of the model.

The Analytical Hierarchy Process (AHP) technique was developed by Saaty [15, 16] as a powerful instrument used for multiple criteria decision making purposes [17]. AHP uses pair wise comparisons to identify the priority of alternatives in a multi-criteria decision-making problem [18]. At the top of the hierarchy in this study is the accessibility to health centers.

AHP basically enables decision-makers to prioritize the alternatives making a series of tradeoffs. First, we should define the indicators. Second, make a series of pair wise comparisons. Third, estimate relative weights for measurement of overall performance [19].

After revealing the accessibility indicators, 5 experts estimated relative weights by using AHP method. Application of AHP to rank-order the eight indicators required 3 steps. In Step 1, the 18 experts selected eight main indicators. In Step 2, five experts made comparisons among indicators and discussed why a given indicator would be more or less important than another and the degree of the difference. In order to help the comparison it was created a nine-point scale of importance between two indicators. The suggested numbers to express degree of preference between each two indicators are shown in Table 1. Intermediate values (2, 4, 6 and 8) can be used to represent comparisons between the preferences.

Table 1: Nine point scale and its description

Definition	**Intensity of importance**
Equally importance	1
Moderately more importance	3
Strongly more importance	5
Very Strongly more importance	7
Extremely more importance	9

In Step 3, researchers calculated the weights for each indicator by K. Goepel Version 9.5.2012 software.

3.Results:

The number of participants that filled in the questionnaires and attended the Delphi procedure is presented in Table 2.

55.5% of participants were female and 44.5% were male. 22.2% were educated in health services management filled and 33.3% were general practitioners.

Selected indicators from analysis of the data collected in the first round of questionnaires were as follows: percentage of people who have access to family physician and rate of access to midwife. The other indicators were incorporated in the second round of questionnaires in the survey. In the second round three indicators were selected as: rate of accessibility to afternoon health services, rate of accessibility to healthy water and rate of accessibility to mental health providers.

Table 2. Participant characteristics in Delphi procedure

		GP	Health manager	Public health
		N (%)	N (%)	N (%)
Gender	Male	3(50%)	2 (50%)	5(62.5%)
	Female	3(50%)	2(50%)	3(37.5%)
	Total	6(100%)	4(100%)	8(100%)
Job experience (years)	Mean	15.7	13.5	12.8
	Min-Max	5-30	4-30	2-18

In the last round rate of accessibility to primary health services, rate of accessibility to primary health providers and rate of accessibility to pregnancy services were chosen. Table 3 shows the results of Delphi rounds for selecting accessibility indicators.

Table 3: Details of Delphi rounds data in selecting indicators

Delphi Rounds	No. of indicators (%)	No. Accepted (%)	No. of Not Accepted (%)	No. of indicators for next round (%)
First	31 (100%)	2 (6.4%)	7 (22.6%)	22 (71%)
Second	22 (100%)	3 (13.6%)	2 (9.1%)	17 (77.3%)
Third	17 (100%)	3 (17.6%)	14 (82.4%)	0

6.4% of indicators were statistical significant in first round and 71% of indicators were asked in the second questionnaire. In the second and third round the return rate of questionnaires were 100% as the first round. Finally the first indicators of accessibility measurement were developed. The statistical analysis of eight selected indicators is shown in Table 4 and 5.

Base on experts' opinions rate of people has access to family physician got the highest score and rate of mental health provider accessibility and Rate of people has access to public health services in afternoon shift got the lowest.

Table 4. Statistical analysis of selected indicators in the first round of Delphi

Round of Delphi	Selected Indicators	Average	Standard Deviation
First	Percentage of people who have access to family physician	4.22	0.80
	Rate of access to midwife	4.11	0.67

Table 5. Statistical analysis of selected indicators in second and third round of Delphi

Round of Delphi	Selected Indicators	Average	Standard Deviation
Second	Rate of accessibility to afternoon health services	4.38	0.77
	rate of accessibility to healthy water	4.66	0.59
	Rate of accessibility to mental health providers	4.33	0.76
Third	Rate of accessibility to primary health services	4.50	0.78
	Rate of accessibility to primary health providers	4.56	0.98
	Rate of accessibility to pregnancy services	4.67	0.59

After developing the first model, it was sent to experts again. They were asked to proof the model and make some changes if necessary to develop the main model. The experts confirmed the model by 100% rate.

The AHP hierarchical structure for this study appears in Figure 1.

The consistency rate was 9.3% and it shows that the data were appropriate.

4.Discussion:

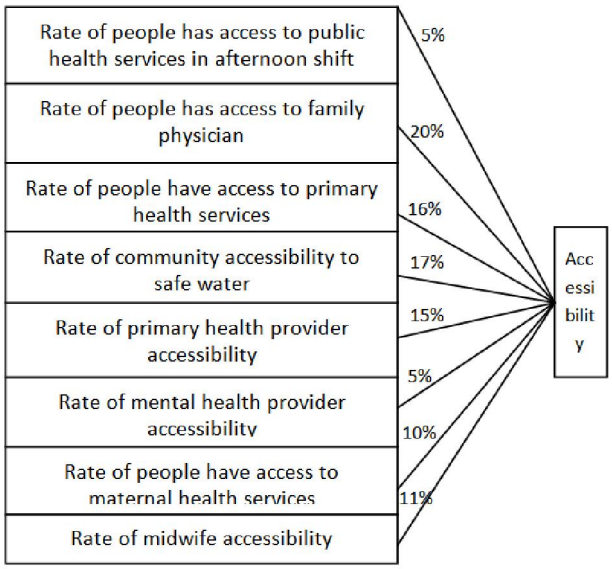

Figure 1. AHP hierarchical structure for accessibility indicators

Having a strong primary health system needs an appropriate performance measurement model to cause a positive impact on population health [20]. Developing accessibility measurement model for health centers provides a new insight to the primary health center and quality of health system. Although some geographical indicators for assessing accessibility to health centers where exist, Iran need to revise and improve the existing indicators. We reported on the development and prioritize of accessibility indicators. Our model will be used to

guide the development of accessibility. Our model components also do not follow a consistent pattern over time.

To date the majority of published studies on developing performance models has focused on different criteria [21-27]. However very little studies have also studied the indicators and prioritized them. Our model gives some weights to the indicators based on the experts' opinions. These weights can help the evaluators to measure the accessibility to health centers exactly.

In all over the world there is a pressure to improve the performance and it is not achievable unless we have a measurement model. The results and the usage of them require the participation of health workers and academia to develop the measurement model and discuss about the indicators and results [5]. In this research we got feedback from the managers, health workers and academia to develop a model.

This model can be used as a template for measuring accessibility in developing countries. We believe that an accessibility model should include not only geographical criteria but also the other criteria as we include our model. The indicators can be used to measure accessibility, but due to health systems they remain to be studied.

This model gives the insight to evaluate health centers accessibility in a developed way by calculating weights of each indicator. This study is unique because a new methodology was used to perform the model.

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