

A Conceptual Model to Estimate Staffing Requirements of Medical Faculties of Medical Sciences Universities in Iran

Tahereh Kashkalani,¹ Mohammadreza Maleki,^{2,*} Seyed Jamaladin Tabibi,¹ and Amir Ashkan

Nasiripour¹

¹Department of Health Services Administration, Science and Research Branch, Islamic Azad University, Tehran, Iran

²Department of Health Services Management, School of Health Management and Information Sciences, Iran University of Medical Sciences, Tehran, Iran

*Corresponding author: Mohammadreza Maleki, Department of Health Services Management, School of Health Management and Information Sciences, Iran University of medical sciences, Tehran, Iran. E mail: maleki.mr@iums.ac.ir

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Abstract

Background: No specific model has been developed so far to determine the number of clinical faculty members required for medical schools as the most important and most costly workforce.

Objectives: Since any action in this regard needs to understand the current status, this study aimed to identify the factors and variables involved in staffing of medical schools in Iran.

Methods: This was an analytical descriptive study conducted with qualitative approach in early 2016. Participants included 15 educational deputies of Medical Sciences Universities in Iran who were selected through purposeful intensity sampling. Data were collected using in-depth interviews and analyzed using inductive qualitative content analysis via seven-stage framework analysis.

Results: Five categories of factors were identified to affect the number of clinical faculties in Medical Sciences Universities of Iran, namely "faculties' functions and range of work", "characteristics of faculty members", "features of the faculties' service delivery location", "department/major properties", and "dominating objectives and policies".

Conclusions: A variety of subjective and inaccurate factors are considered for estimating the required number of clinical faculties in Iran among which only a few are the same as criteria for other faculties. The prerequisites that organize the factors and components in the form of a system are: clearly determining the responsibility of clinical education space and then, defining relatively identical financial incentives for various functions of faculty members.

Keywords: Faculty, Medical Schools, Staffing Requirement (Personnel Staffing and Scheduling), Iran

1. Background

Higher education, owing to its important function, is greatly involved in sustainable development. Therefore, to achieve the goals, it seems to be crucial to attract and manage huge resources for higher education among whom, faculty members are of the most important (1). Providing adequate faculty members has been very obvious in medical schools. Medical members are increasingly considered as the most important capital of medicine schools (2) because of their specific responsibilities beside common roles that all faculties have (3, 4). Thus, every faculty of medicine needs sufficient numbers of qualified members in order to accomplish the assigned tasks (5). This is because any shortage may negatively affect both the quantity and quality of health care (6) and resident learning (7).

A review of studies shows that in recent decades, following the dramatic changes taking place in health care delivery services and medical education, faculty members face growing workloads (8, 9) and the schools' need for academic staff has increased, as well (10). However, since a

large percentage of the total costs of academic health centers are allocated to the medical faculty members, departments need to have an accurate tool to be accountable in assessing the growing demand for faculty members (11).

Despite scientific researches on the estimation of required number of faculty members in other areas, the efforts have not been focused on the medical field (12). There are scarce studies in this regard and they are predominantly limited to a particular specialty. Also, they often have not provided a model. In Halton's study, pediatric oncology physician workforce was estimated for the first time based on a population-based approach with consideration of "clinical and academic workloads" (13). Bachir et al. achieved an overview of anticipated staffing needs of urologists and sub-specialties over the next 5 years via the chairmen of respective departments' point of view (6). In the study of Lightfoot et al. determination of USA's current and future need for "academic urologists" compared with other urologists was considered from residency program managers' point of view where different workloads

of academic specialists (not only curative services) were addressed (14). Linzer et al. formulated the assumptions about physician demographics and work patterns to determine physician staffing needs through designing a model of physician workforce in a hypothetical academic sector of general internal medicine (15). Applying an approach to assess workforce availability (instead of assuming faculty availability based on an average daily or monthly schedule) can be observed in a study conducted by Poehlman in a “family medicine” department (11). To determine the need for faculty members in the field of “family medicine”, two other surveys at the national level were conducted by Holloway et al. in USA. In both studies, the number of vacant and non-vacant positions plus the main focus of each position and the time share devoted to clinical, educational, administrative, and research practices were considered (16). Clack et al. (17) and Jarrell et al. (18) in similar studies calculated the required hours that faculties were needed on the basis of general medical students’ rotations (curriculum volume) and the time interval spent in any of the five types of training, and at the final stage.

In Iran, despite some models developed for various health care staff, clinical faculties as the most specialized and most costly workforce have been neglected of any coherent and evidence-based planning. To the best of our knowledge, no study so far has been conducted regarding the estimation of required number of medical faculties or providing a model in this regard. It should be noted that, after the integration of medical education in health care delivery since 1985, clinical faculty members have the responsibility to deliver health services in teaching hospitals, which is apart from patient care in hospitals without the teaching role; and this issue has increased their challenges (19); these all increases the importance of designing an appropriate model.

2. Objectives

Knowing that describing what practically is taking place can be a start (20), the study has identified the current factors and variables involved in Medical Sciences Universities of Iran and analyzed the reasons for the use or non-use of specific variables.

3. Methods

This was an analytical descriptive study conducted in early 2016. Given the lack of research history and little knowledge on this subject, in order to deeply understand the current procedures in determining the required number of faculties in medical schools (each of which affiliating some governmental teaching hospitals) in Iran, a

qualitative approach was followed. Also, because the goal is to achieve “experiences” and understand “processes” of the relevant universities, “in-depth individual interviews” were selected.

The research population included educational deputies of a number of Medical Sciences Universities in Iran with nationwide medical schools (as they were expected to play the most significant role in the distribution of faculty recruitment permits allocated by the ministry of health and medical education (MOHME) and had conversance on the status of all departments). Total number of research population was 46, out of which 15 were selected as participants by purposeful intensity sampling (information-rich cases that can be the best examples of the phenomenon). For this purpose, the core universities were first chosen. They were top 10 largest Medical Sciences Universities of Iran, which might have had more experience due to having a wide variety of departments and also a longer history with respect to estimating the number of faculty members. After interviewing these deputies, in order to prevent bias through neglecting the possibly different conditions of smaller universities and to make the sample representative of the whole population, a number of smaller universities were selected, too. Thus, we tried to select universities with different conditions in terms of location, history, etc. Inclusion criteria as a “research sample” were “being in the position of a university’s educational deputy”, “being a faculty member”, “having at least 5 years of work experience in the field of medical educations” and being sufficiently familiar with the issue of “Academic Faculty Affairs” at Medical Sciences Universities. Sampling was continued until saturation based on continued comparison process (in 15th interview).

All interviews were done by one of the researchers with graduate-level education in health care management who works at MOHME and had ten years executive experience in estimating staffing requirements. She was 38 years-old and conducted the interviews face to face. Each interview lasted one hour on average. Notes were taken of the contents and the interviews were audio-recorded upon consent from the interviewees. A few days before the interview, during a telephone conversation with the participants, the purpose of the interview was clearly stated and their consent was obtained. Given the attractiveness of the subject and needs of the universities, all the participants enthusiastically entered the interview and nobody refused to participate.

Given that the goal was to explore “what is going on”, in designing the interview questions, no prefabricated model was used. The researchers’ effort on the implementation of interviews was focused on obtaining data indepen-

dently in an exploratory manner. Interviews' validity and credibility was increased through triangulation (creation of variety in universities' location and history). In addition, for greater certainty, "member check" strategy was used. In other words, the researcher's interpretations of the statements by the interviewees were presented to them and according to the received feedback necessary amendments were applied to the interpretations.

Data analysis method was a "qualitative content analysis" of the interviews which was conducted manually with the "seven-stage framework analysis" approach aiming at classifying and organizing the data (21) as follows: 1. Each recorded interview was transcribed immediately after the completion of the interview due to the possible use in subsequent interviews; and hand-written notes were prepared, as well (Transcription).

2. Interviews were listened several times and the associated transcripts simultaneously were read carefully, in order to become familiar with the general structure of data (Familiarization with the interview).

3. After familiarization, key sentences of the transcripts were identified. Then, the key sentences of interviews were segmented based on similar contents covering research questions and thereby, a primary "code" was assigned. This step was continued until theoretical saturation point, i.e. no new code was emerged (coding).

4. After coding the first few transcripts and following several screenings and considering similarities and differences of the obtained codes, they were merged and limited. They also created categories with new concepts and the relationships between subcategories were specified. Thus, the initial framework of the analysis was formed (identifying analytical framework).

5. Using the provided framework, manuscripts were referred to and by reviewing the scripts and identifying the target sentences, the appropriate code was allocated to the final analysis framework (applying the framework).

6. For each category, a framework matrix was prepared in Excel format and data were arranged by the interviewees and the codes (charting data into the matrix).

7. With frequent assessment of the data matrix, main themes were emerged. The classes created were combined together to recognize a theme that is able to connect to other classes or concepts; and therefore, the conceptual framework of the study was gradually formed (Interpreting the data).

Peer review was used for further assurance of the extracted codes and increase of the data confirmability. That is interviews were independently reviewed in-depth by an individual (aware of the issue) other than the researchers, and thematic analysis was conducted.

4. Results

The findings of the present study indicate that 80% of the participants were male and their mean age was 50 years. All of them held a doctoral degree or higher. 73% were clinical faculty members while the rest were nonclinical faculties. They were representatives of Esfahan, Iran, Kerman, Mashhad, Mazandaran, Shiraz, Shahid Beheshti, Tabriz, Tehran, Zahedan, Abadan, Babol, Birjand, Kashan, and Shahrekord Universities of Medical Sciences. The participants' characteristics are shown in Table 1.

Table 1. The Characteristics of the Participants in the Study

Participant	Age	Gender	Education
P1	50	Female	PhD
P2	55	Male	PhD
P3	50	Male	Medical specialist
P4	60	Male	Medical specialist
P5	55	Male	Medical specialist
P6	54	Male	Medical sub-specialist
P7	52	Male	Medical specialist
P8	44	Female	PhD
P9	46	Male	Medical sub-specialist
P10	50	Female	Medical sub-specialist
P11	42	Male	Medical specialist
P12	51	Male	Medical specialist
P13	48	Male	Medical specialist
P14	48	Male	Medical sub-specialist
P15	44	Male	PhD

In the coding stage, 79 codes were identified that eventually reduced to 38 after repeated revisions and integration of the extracted codes. Then in the combination stage, 13 categories were derived. The identified codes and categories are given in Table 2.

In addition, by combining the categories, the main factors involved in determining the required number of clinical faculties in medical schools of Iran were categorized into five main themes that are explained below:

1. Faculties' functions and range of work

The first identified theme was a combination of three categories of "teaching workload", "clinical service workload", and "managerial workload". This theme was observed as the most important factor in determining the required number of faculties derived from the interviews of all participants and all the other factors somehow related to this factor.

The volume of “teaching work”, which is mostly “clinical”, is affected by educational levels, the number of majors in each degree, the number of students in each major and also clinical course offered by the faculty of Medicine for non-medical majors such as nursing, midwifery, etc. The low volume of theoretical courses is not a reliable criterion. The number of students, of course does not follow a given standard. Although the number of “general medical students” was introduced as one of the important variables by the majority of the participants, it is not practically concerned in some of them because the residents are in priority and also students’ admission capacity is unpredictable due to frequent changes in physician training policies.

The volume of “clinical services” is one of the most challenging identified aspects. Participant No. 1 said: “The response to the Non-Educational requirements is what exists at the moment and it is somehow forced into medical schools”. Participant No. 4 admits by stating that “No department in the School of Medicine announces that it has n residents so it needs m professors per resident or no department says that it has n courses or n researches so accordingly it needs some professors. Most of their requests are focused on their health care services ... When teaching hospitals were affiliated units to the Ministry of Science, there was no national and local pressure on the Ministry of Science for admission of patients, but now the teaching hospitals are responsible for medical treatment, as well”. Of course, some of the participants believed that their activities are not only medical, but they are educational-medical. Some others believed that when education standards are not respected then, in terms of quality, they cannot be educational-medical. Participant No. 7 says: “there are clinics in the name of education, starting to work from morning to afternoon by visiting 80 patients! It is obvious that this is not education; there is no time for scientific debate between teacher and student. However, the student has to stay with the professor”.

Regarding “managerial workload”, it is certain that this aspect is not directly considered in the staffing requirements of schools; however, because of its role in reducing the number of obliged teaching hours of a university professor, it is indirectly included in the requirement discussions of the faculty members.

2. Characteristics of faculty members

This theme includes “demographic” and “organizational” characteristics of faculty members. Some of these features are associated with the “supply” of staff; i.e. after calculating demand for faculties, the net required staff is obtained based on the available hours of existing staff which depend on some certain features of the staff. For example, in a department, the age of staff and the academic

personnel pyramid of that department are considered. The academic rank is also of importance because it changes the patterns of workload and determines the minimum assigned teaching hours of a faculty. Employment relationship type of faculty members and gender were cited by some participants, too.

3. Features of the faculties’ service delivery location

Service delivery location represents the university or hospital geographical areas or the affiliated centers. This factor could have an impact on the type and volume of concerned faculties’ workload. In a recently published document entitled “training preparatory document in the field of medical education”, the universities have been sub-grouped and according to their different regional, national, and international missions, each of which were determined with different capacities. In this regard, primary universities in each group are responsible for educating their subsidiaries that must be considered in their workload. The participants believed that even factors such as the time required to travel between two universities for teaching must be taken into account.

The participants believed that “characteristics of clinical education spaces” are important, too. For instance, more centralized teaching facilities bring more saving in the number of faculty members. In relation to the number of teaching hospital beds, the participants had different views. Participant No.1 believes that: “Given that the clinical faculties have medical practice to be considered, one of the indicators would be teaching hospital beds... However, the Health Ministry has not established any standard in this regard. Some of these may have an approximate limit, for example, an internist might be able to manage the responsibility of 10 beds in maximum while other specialists may have another capitation”. At the other end of the spectrum, there were participants who do not consider this factor because they believed that the number of teaching hospital beds is not dependent on the faculty of medicine and it is usually determined by the curative affairs deputy or national policies. Also, they took it into account that the number of beds is a crude indicator and other relevant indicators such as “bed turnover rate” can be a more illustrative indicator.

“The characteristics of the geographical area” as the third identified dimension often includes issues such as the impact of advancement or deprivation level of an area on attraction and retention of faculties. The general perception of the participants was that in deprived areas, the probability of request for withdrawal from service should be considered in faculty planning. Also, considering that deprived areas are not usually attractive for specialists, universities need to use faculty members in some cases to meet the mere medical needs of the area. Participant No.

13 says: “We are not in a province with attractions for subspecialists to work here; therefore, when there is no desire other than serving as a “faculty member”, that means that we attract the person as a faculty member, while it is actually for the purpose of meeting “. Meanwhile, another challenge in more deprived areas is the fact that the covered hospitals are “teaching” and there is no hospital merely focusing on medical treatments in the city; thus, people’s medical needs must be all met in the same teaching hospital.

There is also another form of reduction in available staff in advantaged areas. In fact, due to the existence of active private sector in metropolitan cities, involvement in education is not tempting for some faculty members. Thus, they spent part of their working time in private sectors legally or illegally (dual practice). Therefore, since the head of department has to answer his patients and students, he/she requests for more faculty members”.

4. Department/major Properties

Interviewees believed that clinical departments/majors should be considered separately because of their different “nature” and “scope”. One evident thing in the words of the participants was priority of major fields (internal medicine, surgery, pediatrics, and gynecology) over minor disciplines due to more common diseases in these areas, high number and wide variety of wards, and the fact that most rotations by medical students are in these wards. Another item is associated with differences in patients’ length of stay in sub-division wards. Opinion of the participant No. 5 in this case was as follows: “Patients’ turn-over varies widely in different wards. For example, in the surgery department, patients are discharged soon but in the neurology department they may stay a month ... There is a role in educating the patient in the first two or three days, then he/she comes out of the educational process”.

5. Dominating objectives and policies

The current policies and objectives in the field of health and medical education cover all the factors and other aspects as an over-arching umbrella. One of the most important policies of the MOHME is compliance with “accreditation standards” which are set by specialty boards. Participant No. 12 says: “We have a series of educational standards. If we want to absorb residents in any field, there must be at least five faculty members from whom at least 2 members should be Associate Professors ... Therefore, we put departments on priority from which not absorbing faculty members may lead to their disapproval “. Another proposed issue in national macro policies is “the obligation to keep all wards active, even wards without residents in the referral teaching hospitals”. Therefore, wards have to have their related professors. Compliance with the policy

of “elite’s recruitment” was another factor expressed by the participants. Statements of participant No. 7 were as follows: “The ministry instructed to recruit the first to third ranked examinees of the national board examination as university faculty members. Now, it is possible that your dermatology department has sufficient academic staff, but one of its students becomes the first ranked examinee, therefore he must be recruited due to his competency anyway. This is a factor in large universities and rarely in small universities”.

Universities also may set policies for themselves such as maintaining balance between the numbers of subspecialty services (to each other) in different departments. Participant No. 7 says: “It is not right in a department, we have 3 sub specialized services and 10 in another department. They have to be proportional to some extent”. Another recent policy which is followed by some core universities is to set up a general internal department. Given that due to the large number of specialty and subspecialty trainees in such universities, educational rounds are conducted practically for fellows or Residents; consequently, interns and medical stagers do not adequate chance of clinical training; therefore, a general internal medicine department is established for them, which naturally needs additional faculties. Meanwhile, when determining the number of needed faculties in some universities “financial prosperity of the major in the labor market (acquired income)” is considered. Comments of the participant No. 3 was as follows: “One of the things that we do in our university (that is perhaps beyond our present task) is that we avoid recruiting faculty members that are not expected to have a prosperous market (although we cannot prevent their training)”.

“Personal ideas of the university authorities and advocacy level among various departments” in determining the number of faculties was another issue emphasized by all the participants. Participant No. 5 says that: “The current situation does not have any rule. The needs are increased and decreased based on department condition or based on communication of the head of departments with the dean and the president”.

Specific objectives and policies of a department are also involved. In this regard, if the policy of a department is holding educational rounds separate for different levels of inclusive students (once for residents and once for interns and stagers so that all trainees benefit educational content according to their level), naturally the number of required academic staff will be increased.

As a final recapitulation, the findings can be presented in [Figure 1](#).

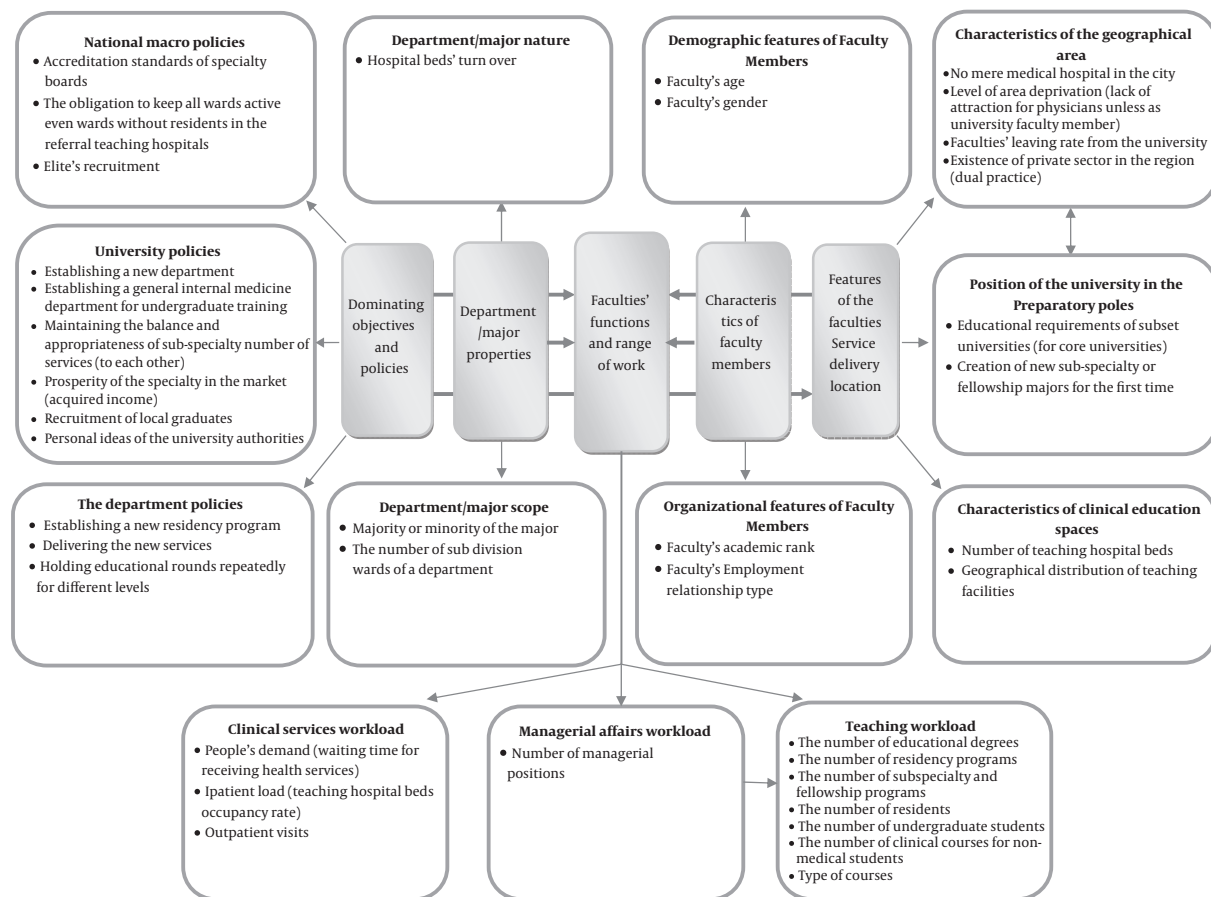


Figure 1. The Conceptual Model to Estimate Staffing Requirement of Medical Faculties in Iranian Medical Sciences Universities

5. Discussion

The study was conducted to identify involved factors and components in estimation of the required number of clinical faculty members in Medical Sciences Universities in Iran. The difference between this category of faculty members and other faculty members in terms of duties is one of the most important points emphasized in the research. Using a qualitative approach to understand the nature of the subject showed that it is currently affected by five sets of factors. One of the most important findings of this study was that “faculties’ functions and range of work” is not only effective factor, but the service delivery location, type of educational department (and sub division majors), characteristics of the faculty members, and current policies are also influential. Of course, most influential variables are applied inaccurately and they do not follow a systematic trend, any relevant standard or a specific formula. In addition, the findings are thought provoking since they point to “clinical service workload” in faculty

staffing; and challenge the assumption that estimation of the faculty members is solely or largely confined to their “educational” role. In other words, despite some experts believe that the volume of patient care should not determine the number of needed faculty, nonetheless, today the volume of health care services fully is involved in that, for all universities.

In the Sherbino’s study, also, the majority of participants indicated that clinician faculties require an active clinical practice (22). In a study by Halton et al. the number of patients, types of medical treatments and the complexity of diseases affected the number of required faculty members (13). Lightfoot et al. also pointed out the type of care (14). McGregor et al. considered type of admission (emergency and non-emergency), patients’ length of stay, and total hospital costs in this regard (23).

In Iran, part of the reason for an increased focus on the role of “clinical service delivery” of clinical faculty members is the integration of medical education and the need

to simultaneously meet mere medical needs of people in teaching hospitals (especially after the initiation of Iran's health transformation plan (HTP) since 2014 that in turn increased the number of visitors). According to the participants, the reason for not using private sector specialists (non-faculty members) to meet mere clinical needs is the current payment system and faculty members' income from the field of treatment compared to their income from teaching or research sections which has been proposed since around 20 years ago when hospitals became autonomous and there was an emphasis on hospitals' revenue generation (teaching and non-teaching). This issue is also true in other countries (15, 24) and the current environment in the academic institutions indicates greater reliance on clinical income (25). Obviously, under conditions that payment system is clinical-oriented, outsourcing a part of health care affairs to the private sector particularly profitable affairs is with resistance by faculties of the hospital.

The main challenge ahead for "clinical service delivery" as one of the most highlighted duties for medical faculties in Iran might be the fact that no specific model for the assignment of workload to faculties and share of this duty has been presented so far. Some participants believed that in the current situation that the patients' visits to teaching hospitals is high, it is necessary to define a percentage of faculty members' time for mere clinical activities; because if residents work alongside attending faculties, their activity standard (the maximum patients' visiting hours a week) is disturbed and therefore, at large number of patients, fatigue and error rate increases as well. According to the participants, this does not happen due to lack of a clear definition of the educational space management, which is considered as a key problem of the current healthcare education system since the health ministry's curative affairs deputy is responsible for most of the funds and management activities of hospitals while education is unfairly expected from the education departments! However, if the responsibility of work is delegated to departments from beginning to end, they will plan and also define certain amount of mere clinical work for their faculty members.

Variables related to the teaching roles of the faculty members have been considered in studies regarding the medical faculties (11, 17, 18). However, Jones et al. in a study on nursing associate degree programs came to the conclusion that the use of credit hours for determining the clinical program workload is often meaningless since high percentage of the faculties' time is spent in treatment centers (26).

There are two competing hypothesis about the impact of "residents numbers" which is one of the most important identified variables in most studies; one hypothesis is that

the existence of residents increases the need for attending faculty because of needed time to training and supervising the work of the residents. However, the other hypothesis shows that with the presence of residents, education and treatment happen simultaneously; so residents can increase the work output (27, 28). Therefore, it can be inferred that the influence of post graduate numbers on the number of needed faculty is the exact opposite (29). Evidence to this claim is increase in the faculty members' workload due to the reduction of residents work hours in 2003 and again in 2011 in USA (30). In general, it seems that a minimum number of faculty members are required to supervise and monitor residents' work; however, from some point onward, existence of residents as reinforcement staff for training reduces the need for faculty members to some extent.

Influence of "managerial workload" in the estimation of clinical faculties is consistent with Arenson and poehlman's study (11, 29). Participation in administrative activities, particularly at a senior level, can be regarded as a fundamental feature for clinical faculty members (31); while in Sherbino's study, focus group members did not stand consensus on the necessity of specific "managerial position" (such as program supervisor, head of department) in the role of faculty physicians (22). Likewise, however, opposing to Arenson's study (29), it was revealed in this study that the volume of administrative/executive affairs such as membership and participation in committees and being chief editor of publication journals, etc., do not have any impact on determining the need for faculty in any of the universities.

Lack of "research" impact as one of the faculty members' tasks in the estimation of the clinical faculties is another finding of this study that all participants agreed upon. However, a study of the top 40 research-intensive medical schools implied that they had significantly more faculties than the less research-intensive medical schools and the community-based colleges (32). Joiner et al. also concluded that "student-to-teacher" ratio is lower in medical research-oriented institutions than other medical institutions (33). The dealing with "research" topic in academic work assignment models remains a controversial issue and it is considered as a front of mind matter to address in the formulation of a new faculty model (34). One of the principal changes which has been taking place since 10 - 15 years ago is creating more differentiation in positions and roles to meet the needs of medical education and alleviate tensions and role conflict in some medical schools of the Western countries. Faculty positions at those schools are clearly differentiated; "educational" track focuses exclusively on teaching, while "clinical" faculties have outside medical practices and teach part-time to reduce con-

flicts of time and role. "Research" faculties often do not teach; instead they focus on knowledge generation. It is clear that faculty members associated to each position are promoted and they are assessed based on the type of position and according to the differentiations (35). Thus, the required number of faculties is calculated according to the relevant type of position separately. For example, an Australian study of the trends for recruiting faculty members in the universities indicates that the number of faculty members with just teaching function has increased with student enrolments, and the number of faculty members with just research function has increased in the face of growth of external funding for research (36). Research time share to estimate the academic specialists can be seen in the variables of Lightfoot and Holloway's studies (14, 16).

Dagird in a comprehensive study in the department of family medicine has used time management software to calculate required FTE for all the functions of faculty members including clinical, educational, research, managerial, and even the administrative affairs, by considering a variety of variables for each function (25). Holloway et al. (16) and poehlman (11) covered the same functions.

The sub-variables of "faculty members characteristics" identified in the study are in compliance with studies of some researchers. Linzer et al. announced part-time employment, pre-retirement, termination, turnover, pregnancy and planned shocks such as vacation and unplanned shocks such as illness or caring for dependents as variables in order to determine the number of required full-time (FTE) doctors to run a university department (15). In Howell et al. study, no significant change was observed in faculty members' role based on age, gender, work experience, academic rank, or discipline (12). Bunton and Corrice, Linzer et al. and Nassar (8, 15, 24) contrary to Crespo (37) came to the conclusion that female medical faculties serve less time because of more challenges in balancing work and life. In the current study, gender was not considered in terms of the amount of time to be available; rather the objective was set as the need for female faculties in some departments because of cultural considerations. The probability of leave is observed as an effective factor in the study and most other studies examining factors related to supply (14). Monitoring the number of faculty members on the edge of retirement as an indicator for vacancy of faculty positions is important; but prediction of the exact trends of retirement is not as easy as considering the tendency of faculties to retire at different ages (38). Employment relationship type was not directly mentioned in other studies of faculty estimations. It seems that one of its possible reasons was the small number of faculty members with permanent employment relations at universities in the West. Since in the last 30 years, traditional faculty

members' models (full-time professors with approved positions) to a large extent (over 70%) have been removed and replaced by temporarily employed faculty members (35).

University type and its location in the national or province level and the need to meet some of the requirements of community colleges is compatible with Aronson's study who believed that restricting factors such as the need to travel to remote facilities should also be considered in the clinical faculty workload (29). Grolamo also believed that needs of clinical teaching institutions should be considered differently, because of their different missions (some have more emphasis on research and others on maintaining expertise and treatment skills) (3). Type of department or major is compatible with studies of Robertson and Germov (34) and Howell (12). Also, prosperity of the specialty in the market (revenue it generates) is seen in the study of Stuart et al. (39).

According to the abovementioned statements, it can be claimed that although in previous researches some of sub-components of the main factors identified in this study have been mentioned, recent findings are more comprehensive due to its national perspective and using in-depth qualitative research methodology. Regarding the limitations of the study, the research was concurrent with the implementation of health transformation plan which resulted in increased visits to teaching hospitals and augmentation of physicians' income from clinical service. Moreover, some of extracted components might be more of compliance with Iran due to the integration of medical education and health services, so it somehow affects the external generalization to other countries.

Finally, it can be said that in Iran a variety of subjective and inaccurate factors are considered for clinical faculty estimation that the role of some of these components is bolder than the others due to the integration of medical education and health services. Indeterminacy in responsibility of clinical education space and tremendous difference in clinical services' financial incentives against other functions of faculty members have contributed to current situation. Thus, if the responsibility of clinical education space and its standards are clearly defined and relatively identical financial incentives are then considered for various duties of faculty members, it can be expected that all the objectives of university/department will promote together; therefore, to recover part of one or more functions, there will not be need to recruit additional faculties.

In addition to outlining the current status that was the aim of this study, examining the expert views regarding the optimal model of estimation of required clinical faculty members and also study of identified factors, the components and variables in the form of quantitative methods and mathematical models and considering a partic-

Table 2. Extracted Codes and Categories

Categories	Codes
Teaching workload	The number of educational degrees
	The number of residency programs
	The number of subspecialty and fellowship programs
	The number of residents
	The number of undergraduate students
	The number of clinical courses for non-medical students
	Type of courses
Clinical services workload	People's demand for sub-specialty majors (waiting time for receiving health services by patients)
	Inpatient load (teaching hospital beds occupancy rate)
Managerial workload	Outpatient visits (clinics)
	Number of managerial positions
Demographic features of Faculty Members	Faculties gender
	Faculties average age in a department
Organizational features of Faculty Members	Employment relationship type of faculty members
	Faculty members' academic rank
Position of the university in the preparatory poles	Educational requirements of subset universities (for core universities)
	Creation of new sub-specialty or fellowship majors for the first time (following technology advancement) in core universities
Characteristics of clinical education space	Number of teaching hospital beds
	Geographical distribution of teaching facilities in the city
	No mere medical hospital in the city
Characteristics of the geographical area	Existence of private sector in the region (dual practice)
	Deprivation level of the area (lack of attraction for physicians work unless as faculty member)
	Faculties' leaving rate from university
Department/major scope	Majority or minority of the majors (prioritizing the majority fields)
	The number of sub division wards of a department
Department/major nature	Beds' turn over (due to the type of related diseases)
National macro policies	Accreditation standards of specialty boards
	The obligation to keep all wards active even wards without residents in the referral teaching hospitals
	Elite's recruitment
University policies	Establishing a new department (in small schools)
	Establishing a general internal medicine department for undergraduate medical students' training (due to specialty and sub-specialty)

ular medical specialty field with more details are recommended for further research.

5.1. Ethical Considerations

Since the manuscript is extracted from a PhD thesis, it is approved by the affiliated councils of the university and it is checked in terms of ethical considerations. Also, despite the fact that the research does not relate to private aspects of the participants, confidentiality of the information they shared was assured. Also, information has been gained voluntarily and the participants were informed of the maximum possible information about the research aim and objectives. Other ethical issues including data fabrication and/or falsification, redundancy, etc. have been completely observed by the authors.

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