ASPI | Afarand Scholarly Publishing Institute; Turkey
ISSN: 2345-2897; Health Education and Health Promotion. 2023;11(4):569-579. 10.58209/hehp.11.4.569

Empowering Healthcare Workers: Insight from an Interpretive Structural Model for Educational Needs in Iran

ARTICLE INFO

Article Type
Qualitative Research

Authors
Mansoori S.*[1] *PhD*
Mahdavi F.[2] *MSc*
Behjati Ardakani F.[3] *PhD*
Bagheri F.[4] *MA*
Niroumand Sarvandani M.[5] *PhD*

How to cite this article
Mansoori S, Mahdavi F, Behjati Ardakani F, Bagheri F, Niroumand Sarvandani M. Effect of a Health Belief Model about Climate Change on Collegians . Health Education and Healt Promotion. 2023;11(4):-569-579.

ABSTRACT

Aims Healthcare workers are crucial in the healthcare sector, and understanding their educational prerequisites is of paramount importance. This study employed interpretive structural modeling to develop a comprehensive framework for elucidating these prerequisites in Iran.

Participants & Methods We engaged 27 participants, including academic staff from the Universities of Medical Sciences and managers from the health and treatment network in Iran. Data were collected through self-administered questionnaires. The identified educational needs underwent validation using the Lawshe content validity index, resulting in a substantial content validity ratio (CVR) of 98%. Interpretive structural modeling was then applied to categorize and prioritize these educational needs.

Findings The study unveiled nine essential educational needs for healthcare workers in Iran, covering domains, including effective communication skills, internet resource utilization, responsibility, work ethics, healthcare-related laws and regulations, decision-making and problem-solving abilities, teamwork, legal and ethical principles, management skills, and specialized healthcare knowledge, of which communication skills, internet resource utilization, responsibility, and work ethics emerged as the most influential factors.

Conclusion This research offers valuable insights for the improvement of healthcare worker education and training programs in Iran.

Keywords Education; Health; Health Services Needs and Demand

[1]Department of Education, Faculty of Humanities, Arak University, Arak, Iran
[2]The Health of Plant and Livestock Products Research Center, Mazandaran University of Medical Sciences, Sari, Iran
[3]Department of Counseling, Faculty of Humanities, Ardakan University, Ardakan, Iran
[4]Department of Education, Yazd Branch, Islamic Azad University, Yazd, Iran
[5]Center for Health Related Social and Behavioral Sciences Research, Shahroud University of Medical Sciences, Shahroud, Iran

Correspondence
Address: Department of Education, Faculty of Humanities, Arak University, Basij Square, Karabala Boulevard, Arak, Iran. Postal Code: 3848177584
Phone: +98 (939) 4363620
Fax: +98 (86) 32760104
smansoori06@gmail.com

Article History
Received: May 20, 2023
Accepted: June 26, 2023
ePublished: July 2, 2023

CITATION LINKS

[1] The policy analysis of iran's health transformation plan ... [2] Outcomes of health care reform implementation in slum areas ... [3] Incentive policies for the retention of physicians and nurses in deprived ... [4] SWOT analysis of health reform plan on healthcare sector from ... [5] Educational needs of family physicians and health care ... [6] Educational needs of family physicians in ... [7] Need assessment about managerial education in managers and chief ... [8] Needs assessment for interprofessional education: implications for ... [9] Needs assessment of community health workers to enhance efficient ... [10] Evidence-based medicine among Jordanian family physicians: Awareness, ... [11] Program evaluation of a child and youth mental health ... [12] Risk and protective factors affecting drug craving among patients with ... [13] Educational need assessment for empowering ... [14] Investigation of priorities and needanalyses of ... [15] Educational needs assessment among prehospital emergency ... [16] Assessment of the educational needs of general practitioners ... [17] Assessing educational needs of nurse managers affiliated ... [18] Educational need assessment of nursing personal of Shahid ... [19] Educational needs assessment of medical school's clinical faculty ... [20] Educational needs assessment for employees in outpatient department: A ... [21] The effectiveness of mindfulness-based stress reduction ... [22] Need assessment of nursing personnel of jahrom ... [23] A study on the educational needs of the managers of ... [24] Assessment of the most important educational needs ... [25] Needs assessment of continuing education programs for nursing staff ... [26] Improving the quality of care and professnional functions with needs assessment and educational ... [27] Assessment training needs of psychiatric ward nurses in educational ... [28] Primary health care experience ... [29] Primary health care success and challenges ... [30] Validation and psychological properties of the Persian version of DSM 5 Yale ... [31] Educational needs assessment of faculty members of Tabriz University of ... [32] Comparing current organizational culture and desirable organizational culture ... [33] Educational needs of the staff of teaching hospitals in Yazd ...

Introduction

Iran's higher education system has made significant strides in the realm of health and treatment, aiming to cater to the evolving needs of society. Health and medical indices have significantly grown in the past two decades [1-3]. However, it is imperative to continue enhancing the system, particularly in terms of training healthcare professionals with a social-oriented health approach [4]. Several developed countries that prioritize community-oriented medical education have successfully implemented key features to achieve this goal. These features encompass establishing a robust connection between medical education and the future work environment, tailoring professional training based on society's actual needs, fostering a reciprocal relationship between medical education and the healthcare system, imparting knowledge on the management of chronic and prevalent regional diseases, and nurturing essential skills in the learning process. These essential skills include problem identification, problem-solving, decision-making, research, and evaluation. These countries have effectively developed and integrated these features into their educational systems, ensuring that physicians consider the social, economic, cultural, and other pertinent aspects that profoundly influence patient care [5]. Nevertheless, experts have raised concerns regarding the insufficient knowledge of medical graduates in critical areas that are fundamental for general practitioners, regional health team managers, or family physicians [6]. As a result, it becomes paramount to identify and prioritize the requisite training requirements for healthcare providers, particularly in underdeveloped regions. In-service training is widely acknowledged as a pivotal intervention for augmenting healthcare services and competencies. It plays a significant role in enhancing health outcomes and is regarded as an indispensable tool for addressing the educational needs of healthcare workers [7].

Research in various countries has demonstrated the positive impact of needs assessments and on-the-job training on the performance of healthcare providers. Needs assessment increases readiness for timely action, and leads to efficient services in the field of health and healthcare [8, 9]. In a study conducted in Jordan, approximately 60% of family physicians who did not integrate evidence-based medicine into their daily practice, expressed the need for guidance and on-the-job training to effectively utilize evidence-based medicine and ensure its efficacy [10]. Likewise, a training program targeting the enhancement of children's mental health care was implemented for family physicians in England. The outcomes of this program indicated notable improvements in various aspects. Family physicians exhibited enhanced diagnostic skills for mental disorders in children and adolescents, reported increased clinical confidence, and demonstrated improvements in their diagnosis and treatment practices. These findings serve as compelling evidence of the positive impact of targeted training programs on healthcare providers' performance in specific domains [11, 12].

Numerous studies have been conducted to investigate the educational needs of healthcare professionals, specifically physicians and nurses, in Iran. For example, Kabir *et al.* [5] conducted a study on the educational needs of family physicians and healthcare workers participating in an urban family physician program. Their findings revealed that physicians had relatively low educational needs, while healthcare workers had higher educational needs. Shahmahdi *et al.* [13] demonstrated that the educational needs of specialists in the field of health and the environment include general needs (education, assessment, research, and communication, as well as personal development) and specialized needs (pollution, waste management, wastewater treatment, and soil and water pollution). Baghaei *et al.* [14] showed that general practitioners exhibited the highest level of interest in refresher courses and continuous medical education programs related to dermatology in Ahvaz, while they displayed the lowest interest in occupational medicine programs. Asadi *et al.* [15] demonstrated that the educational needs of hospital emergency department staff encompass five areas: management, communication, assessment skills, equipment, and operational skills.

Among healthcare workers, specialized skills, such as ultrasound interpretation, screening for fetal abnormalities, ECG preparation and interpretation, identification of physically and mentally disabled individuals, and assisting in labor were identified as the highest educational needs. Modiri *et al.* [16] found that management skills (planning, leadership, and supervision) and specialized skills (specialized knowledge and skills in healthcare) were the most important educational needs among physicians working in health and treatment departments covered by the Ministry of Health, Treatment, and Medical Education. Abbaszadeh *et al.* [17] investigated the educational needs of nursing managers in state hospitals and emphasized the importance of teamwork, decision-making, and problem-solving abilities, understanding and implementing legal and ethical issues in healthcare, and access to internet-based information. Dehghani *et al.* [18] explored the primary needs of nurses working in hospitals affiliated with the Shahid Sadoughi University of Medical Sciences in Yazd. They identified legal and ethical issues in healthcare as well as specialized skills, such as cardiopulmonary resuscitation, special care, and proficiency with medical devices and equipment as primary needs. Dehghani *et al.* [18] reported communication skills, responsibility and conscientiousness, decision-making and problem-

solving abilities, and teamwork as the main needs among hospital executive managers. Avijgan *et al.* [19] investigated the educational needs of clinical faculty members at the Isfahan Universities of Medical Sciences, which encompassed education, research, personal development, executive and managerial activities, time management, medical services, and health promotion, recording patient information, specialized activities outside the university, and providing education and counseling to society through mass media. Barati *et al.* [20] focused on the needs of service providers in the outpatient departments of Motahari and Imam Reza Clinics in Shiraz. They identified communication skills, problem-solving skills, and management skills (stress and time management) as crucial areas for improvement [21]. Hojat [22] highlighted the importance of communication skills and familiarity with healthcare regulations and guidelines among nurses. Yusefi and Sadeghi [23] identified the training needs of hospital managers, including budgeting, planning, coordination, guidance, organization, recruitment, and reporting. Jannati *et al.* [24] found that nurses had the greatest needs in research and investigation, managerial and supervisory duties, communication, and teamwork, respectively. Zeraatchi *et al.* [25] reported that nurses at the Zanjan University of Medical Sciences had the highest training needs in areas, such as adult resuscitation, mechanical ventilation, ECG interpretation, maternal resuscitation, and preeclampsia. Raispour *et al.* [26] conducted a study to identify the primary educational needs of nursing managers, prioritizing safety and infection control as the highest priority. This was followed by communication, ethics, and professional rules. Hosseini [27] conducted a study on the educational needs of nurses in the neurology department of hospitals affiliated with the Ahvaz Jandishapur University of Medical Sciences. The identified needs included acquiring knowledge of relevant diseases, pharmaceutical and non-pharmacological care, and providing proper nursing care. Sadrizadeh and Malekafzali [28] assessed weaknesses in Iran's primary healthcare system. These weaknesses included inadequate intra- and inter-departmental coordination, patient and provider dissatisfaction, limited resources, and centralized decision-making. In addition, Malekafzali [29] outlined several challenges faced by the Iranian healthcare system. These challenges encompassed insufficient emphasis on primary healthcare in medical education, outdated health information collection systems, absence of a culture of evidence-based decision-making, lack of organization, and limited community participation in decision-making processes.

However, a comprehensive examination of the research background reveals two notable research gaps. Firstly, the existing studies in the field of educational needs assessment have primarily focused on nurses and physicians, neglecting other essential healthcare workers. Considering the vital role played by healthcare workers, particularly in developing countries and low-income areas, it is imperative to address their educational needs as well. Therefore, future research should emphasize the educational needs assessment of various categories of healthcare workers, ensuring a comprehensive approach to workforce development. Secondly, although several studies have identified educational needs, there is a lack of prioritization and stratification of these needs. Understanding the relative importance and impact of different educational needs is crucial for effective resource allocation and planning. Hence, future research should aim to prioritize and categorize the identified educational needs based on their significance and influence. This will enable policymakers, educational institutions, and healthcare organizations to concentrate their efforts and resources on addressing the most critical educational needs first, thereby maximizing the impact of training and development initiatives. The aim of this study was to develop a comprehensive framework to identify and prioritize the educational prerequisites of healthcare workers in Iran using interpretive structural modeling.

Participants and Methods

The case study was done on experts in health and treatment issues, including academic staff of the University of Medical Sciences and senior managers from the Iran health and treatment network. A purposive sampling method was employed, with 27 individuals deliberately selected as desirable cases. The inclusion criteria were familiarity with healthcare workers' competencies and skills. The research tool utilized was a self-interactive questionnaire known as the "ISM" (Interactive Self-Report Measure). To develop and validate the tool, the first step involved extracting the educational needs of healthcare workers through an extensive review of research documents and relevant literature. The selection of primary needs was based on theoretical literature related to the research topic. To gather relevant information, databases and search engines, such as MagIran SID, Google Scholar, and ScienceDirect were utilized. The search terms used included "educational needs of healthcare workers", "educational needs of nurses", "educational needs of physicians", "educational needs of science managers in medicine", "needs assessment in medical sciences", etc. Persian sources covering the period between 2007 and 2022 and English sources from 2007 to 2022 were considered.

Next, the factors were combined and compiled, removing any duplicates, and resulting in the final factors (Table 1). To validate these final factors, the Laoshi content validity index was employed. Experts were asked to assess the comprehensiveness and

hindrances of the factors, based on the factors extracted from the literature. The tool demonstrated a CVR of 98%, indicating its reliability. Additionally, the interpretive structural modeling technique was utilized to analyze and present a model of the factors influencing in-service course quality. The different stages of the ISM are as follows:

1. Formation of the Structural Self-Interaction Matrix (SSIM): The identified factors are incorporated into the structural self-interaction matrix (SSIM). Within this matrix, the presence or absence of relationships between row i and column j is indicated by the placement of specific letters. If the element of row i leads to column j, the letter "V" is assigned. Conversely, if the element of column j leads to row i, the letter "A" is assigned. In cases where the relationship is bilateral, the letter "X" is assigned, and if no relationship exists, the letter "O" is assigned. Given that this research involved the input of multiple experts who completed the questionnaires, the mode method based on the maximum frequency within each domain was employed to construct the structural self-interaction matrix [30].
2. To construct the initial access matrix (RM), the symbols within the SSIM matrices are converted to binary values of zero and one. Specifically, i,j=1 and j,i=0 are represented by V, while i,j=0 and j,i=1 are denoted as X. Additionally, i,j,j,i=1 is replaced with A, and i,j,j,i=0 is represented by O.
3. The final achievement matrix is formed by establishing internal consistency within the initial access matrix. It is important to ensure that if factor 1 leads to factor 2 and factor 2 leads to factor 3, then factor 1 should also lead to factor 3. In cases where this condition is not initially met in the achievement matrix, appropriate modifications are made by replacing the relationships to establish the required consistency.
4. Determining the level and priority of variables.
5. Drawing an interpretive structural model: Based on the determined levels and the final achievement matrix, the model is drawn.
6. Penetration power analysis, dependence, and MICMAC graph drawing.

Findings

To address the initial inquiry regarding the educational needs of healthcare workers in Iran, a comprehensive examination was conducted. This examination encompassed a review of relevant literature and documents, which allowed for the identification and categorization of the educational needs pertinent to healthcare workers. By collating and refining these needs through consultation with health and treatment experts, a final set of nine educational needs was determined as the key factors. Table 1 presents a detailed specification of these factors, based on the gathered information and analysis. Healthcare providers were determined in Table 1.

Table 1. Educational needs of healthcare workers extracted from the literature

Row	Factors	Source
1	Communication skill	Dargahi *et al.* (2010), Avijgan *et al.* (2009), Barati *et al.* (2014), Hojat (2011), Jannati *et al.* (2020), Raispour *et al.* (2021)
2	Familiarity with rules and regulations	Hojat *et al.* (2011), Raispour *et al.* (2021)
3	Responsibility and work conscience	Dargahi *et al.* (2010), Raispour *et al.* (2021)
4	The ability to access information on the Internet	Abbaszadeh *et al.* (2009), Malekafzali (2008), Khoshbatin *et al.* (2014), Atash Bahar *et al.* (2014)
5	Ability to make decisions and solve problems	Abbaszadeh *et al.* (2009), Dargahi *et al.* (2010), Barati *et al.* (2014), Sadrizadeh and Malekafzali (2004)
6	Teamwork	Abbaszadeh *et al.* (2009), Dargahi *et al.* (2010), Jannati *et al.* (2020)
7	Understanding and implementing legal and ethical issues in the field of healthcare	Abbaszadeh *et al.* (2009), Dehghani *et al.* (2013), Raispour *et al.* (2021,
8	Management skills (planning, leadership, and supervision)	Mediri *et al.* (2017), Abbaszadeh *et al.* (2009), Avizhgan *et al.* (2009), Barati *et al.*
9	Specialized skills (specialized knowledge and skills in healthcare)	Kabir *et al.* (2018), Mediri *et al.* (2017), Dehghani *et al.* (2013), Zeraatchi (2021), Hosseini Alimardani (2019)

In this stage, the identified critical needs of healthcare workers in Iran underwent structural modeling for leveling. Thus, a set of finalized questionnaires was administered to experts, enabling the analysis of the interpretive structural modeling method and the stratification of the factors. The nine selected factors were arranged in the form of rows and columns within a table. Respondents were then requested to indicate the type of two-way communication between these factors using the symbols X, A, V, and O. By following the prescribed rules and converting the symbols representing the relationships into binary values of zero and one in the SSIM, the initial matrix (RM matrix) was derived. Then, the internal consistency of the factors was established (Table 2). In this table, the numbers zero and one indicate the type of relationship between the variables and each other.

Table 2. Final achievement matrix

Indicator	1	2	3	4	5	6	7	8	9	Penetration power
1	1	1*	1*	1	1	1	1	1	1	9
2	1	1	1	0	1	1	1	1	1	8
3	1*	1	1	0	1	1	1	1	1	8
4	1	1	0	1	1	1*	1	1*	1	8
5	1	1*	1*	0	1	1	1*	1	1*	8
6	1	1	1*	0	1	1	1	1	1*	8
7	1*	0	1*	0	1*	1	1	1	1	7
8	1	0	1	0	1	1	1	1	1	7
9	1	0	1	0	1	1	1	1	1	7
The power of dependence	9	6	8	2	9	9	9	9	9	

In the subsequent step, the level and priority of the variables were determined by establishing the achievement set and prerequisite set for each factor. The achievement set represented the factors that needed to be attained before a particular factor could be achieved, while the prerequisite set denoted the factors required for the attainment of a specific factor.

By identifying the common set between these two sets, a consolidated set of factors was obtained. If the factors in the common set matched those in the access set (initial factors), they were assigned the highest priority level. Subsequently, these factors were removed, and the process was repeated for the remaining factors.

Through this iterative procedure, the level of all factors was determined. The results of this step are presented in Tables 3-5, which provide a comprehensive overview of the identified levels and priorities of the factors within the research context.

Table 3. Determining the level of factors (first level)

Indicator	Receivable collection	Prerequisite set	Prerequisite subscription with receivables	Level
1	1-2-3-4-5-6-7-8-9	1-2-3-4-5-6-7-8-9	1-2-3-4-5-6-7-8-9	First level
2	1-2-3-4-5-6	1-2-3-5-6-7-8-9		
3	1-2-3-5-6-7-8-9	1-2-3-5-6-7-8-9	1-2-3-4-5-6-7-8-9	First level
4	1-4	1-2-3-4-5-6-7-8-9	1-4	First level
5	1-2-3-4-5-6-7-8-9	1-2-3-5-6-7-8-9		
6	1-2-3-4-5-6-7-8-9	1-2-3-5-6-7-8-9		
7	1-2-3-4-5-6-7-8-9	1-3-5-6-7-8-9		
8	1-2-3-4-5-6-7-8-9	1-3-5-6-7-8-9		
9	1-2-3-4-5-6-7-8-9	1-3-5-6-7-8-9		

Table 4. Determining the level of factors (second level)

Indicator	Receivable collection	Prerequisite set	Prerequisite subscription with receivables	level
2	2-5-6	2-5-6-7-8-9	2-5-6	Second level
5	2-5-6-7-8-9	2-5-6-7-8-9	2-5-6-7-8-9	Second level
6	2-5-6-7-8-9	2-5-6-7-8-9	2-5-6-7-8-9	Second level
7	2-5-6-7-8-9	5-6-7-8-9		
8	2-5-6-7-8-9	1-5-6-7-8-9		
9	2-5-6-7-8-9	5-6-7-8-9		

Table 5. Determining the level of factors (third level)

Indicator	Receivable collection	Prerequisite set	Prerequisite subscription with receivables	level
7	7-8-9	7-8-9	7-8-9	Third level
8	7-8-9	7-8-9	7-8-9	Third level
9	7-8-9	7-8-9	7-8-9	Third level

Factors 1, 2, and 3, namely communication skills, ability to access information in the Internet environment, and responsibility/work conscience, had an equal level of importance. The achievement set and prerequisite set for these factors were exactly the same, indicating that the factors in the achievement set were also present in the prerequisite set. As a result, these three indicators or educational needs formed the first level of the model, given their shared characteristics and significance.

Factors 2, 5, and 6, specifically familiarity with rules and regulations, ability to make decisions and solve problems, and teamwork, possessed an equivalent level of importance. The achievement set and prerequisite set for these factors were identical, meaning that all factors in the achievement set were also present in the prerequisite set. Consequently, these three indicators or educational needs constituted the second level of the model, given their mutual dependencies and significance.

Factors 7, 8, and 9, which included understanding and implementation of legal and ethical issues in the field of health and treatment, management skills (planning, leadership, and supervision), and specialized skills (knowledge and specialized skills in the field of health and treatment), had an equal level of importance. The prerequisite set for these factors matched the achievement set, indicating that the factors in the prerequisite set were also present in the achievement set. As a result, these three indicators or educational needs formed the third level of the model.

Considering the interrelationships between these educational needs and their influence on each other, a comprehensive model could be presented to depict the hierarchical structure and dependencies among the identified educational needs.

The educational needs of healthcare workers in Iran had three levels that influenced each other in different ways. Within these nine levels, they interacted with each other, as explained across the three levels. Below, the MICMAC graph can be found (Figure 1).

According to Figure 2, educational need number 4 was identified as a key independent variable with high influence power and low dependence. In contrast, educational needs 1-9 exhibited high power as linked variables, indicating that they possessed significant influence power and dependence. The most prominent form of power was dependence,

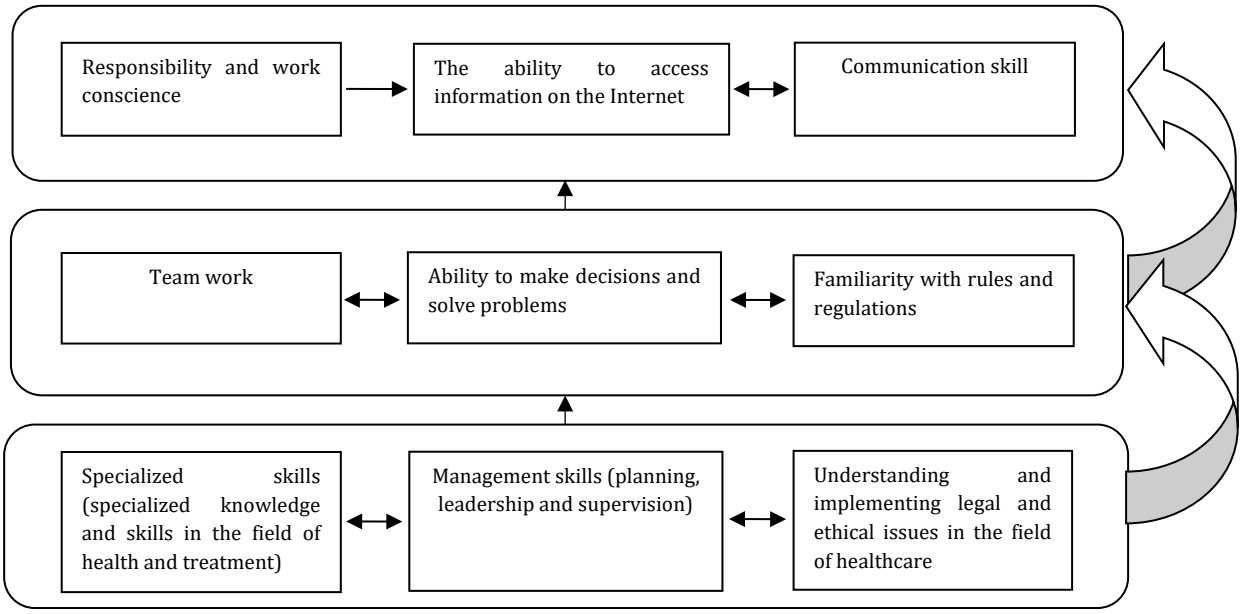

Figure 1. Leveling the training needs of healthcare workers

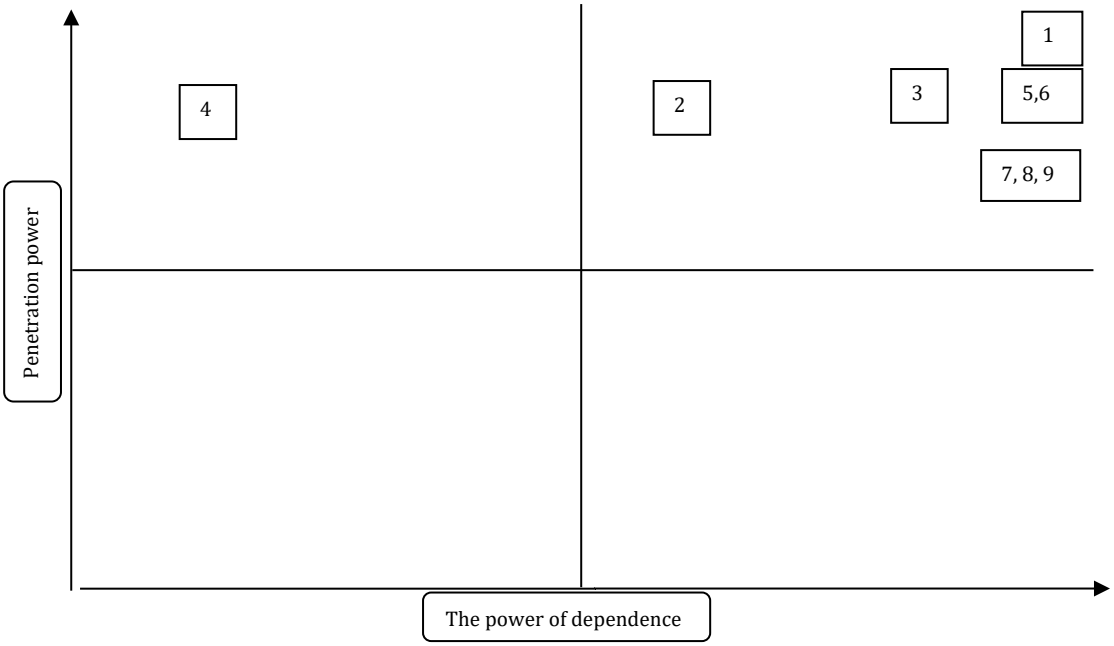

Figure 2. MICMAC analysis graph

signifying the strength of influence. Furthermore, the graph illustrated that none of the variables functioned solely as independent variables (low penetration power and low dependence power) or dependent variables (strong dependence power and low penetration power).

This suggested that most variables had a robust interactive relationship, characterized by mutual action and reaction.

Discussion

In this research, an examination of theoretical literature was conducted to identify the fundamental educational needs of healthcare workers. Through a process of combining and consolidating the identified needs, eliminating duplications, and considering expert opinions, a final set of nine educational needs was determined as the most influential and crucial.

These factors encompassed various areas, including communication skills, familiarity with laws and regulations, responsibility and work conscience, the ability to access information in the Internet environment, the ability to make decisions and solve problems, teamwork, and understanding and implementing legal and ethical issues in healthcare.

Additionally, management skills (planning, leadership, and supervision) and specialized skills (knowledge and specialized skills in healthcare) were

identified as essential components of the educational needs of healthcare workers.

Based on the inputs from experts, an appropriate model was developed using the ISM technique to address the educational needs of healthcare workers. Among the nine identified factors, three factors, namely communication skills, the ability to access information in the internet environment, and responsibility and conscientiousness, emerged as the most influential factors in determining the educational needs of healthcare workers. These factors were placed at the highest level in the model, indicating their significance. At the second and intermediate levels, healthcare workers required familiarity with laws and regulations, the ability to make decisions and solve problems, and teamwork. These factors were categorized as interface needs, serving as important links in the educational framework for healthcare workers. At the third and foundational level, three factors, including the need to understand and implement legal and ethical issues in health and treatment, management skills (planning, leadership, and supervision), and specialized skills (knowledge and specialized skills in health and treatment) were identified. These factors were considered decoration needs, representing essential pillars for comprehensive education in the healthcare field. In addition to illustrating the relationships between these factors, the model classified them into four distinct categories, providing a structured framework for understanding and addressing the educational needs of healthcare workers.

The model developed in this research categorized the factors into four distinct groups. The first category comprised "linked variables" that exhibited both high influence and high dependence. These factors were dynamic in nature, as any changes in them could affect the system, potentially leading to further changes in these factors. Also, factors, such as communication skills, responsibility, work conscience, familiarity with laws and regulations, ability to make decisions and solve problems, teamwork, understanding and implementation of legal and ethical issues in the field of health and treatment, management skills (planning, leadership, and supervision), and specialized skills (specialized knowledge and skills in the field of healthcare) fell under this category. The second category consisted of "key independent variables" that possessed strong influence but weak dependence. These variables formed the foundation of the model and required significant emphasis in their development. In this research, the ability to access information on the Internet was identified as a key independent variable. The third category encompassed "independent variables" characterized by weak influence and dependence. None of the identified educational needs in this research fell into this category, indicating a strong interplay among all factors. The final category comprised "dependent variables" that had low influence but strong dependence. These variables were typically the outcome of multiple contributing factors and rarely served as the basis for other variables. None of the factors or educational needs in the present study were classified as dependent variables. The model's levels were further explained in the subsequent analysis.

As mentioned above, this model had three levels: the third level (the most basic) was the educational needs of healthcare providers, including the three educational needs of understanding and implementing legal and ethical issues in the field of health and treatment, management skills (planning, leadership, and supervision), and specialized skills (specialized knowledge and skills in the field of health and treatment).

Understanding and implementing legal and ethical issues in the healthcare field were identified as one of the fundamental educational needs for healthcare workers. This result aligned with previous studies conducted by Khoshbaten *et al.* [31], Dehghani *et al.* [18], and Abbaszadeh *et al.* [17], highlighting the importance of familiarity of healthcare staff with legal and ethical considerations. The significance of measuring healthcare workers' performance based on their adherence to professional and ethical principles was crucial. It not only contributed to improving employee productivity but also affected patients' attitudes toward healthcare. Ethics plays a vital role in professions that directly interacts with clients, and its importance was amplified in the healthcare sector, particularly for healthcare workers. Being one of the largest groups of service providers in the healthcare system, healthcare workers significantly influence the quality of healthcare. Compliance with ethical standards has become an effective factor in enhancing nurses' performance in delivering quality care. Providing ethical care is a primary goal in healthcare systems worldwide. The healthcare system has various departments, with healthcare workers serving as a vital pillar. Thus, the services provided by this group directly influence health-related indicators and outcomes. Healthcare providers spend a significant amount of time at patients' bedside, experiencing close contact with patients' diverse situations. Consequently, they are frequently confronted with ethical dilemmas. Furthermore, advancements in healthcare technology introduced complexities in ethical aspects, leading to transformation, diversity in ethical problems, and increased occurrence of ethical challenges among the care team members. Compared to other healthcare service providers, healthcare workers face a higher magnitude and scope of ethical issues within their work environment. As integral components of the healthcare system, healthcare workers encounter ethical decisions due to their key role in patient care. Making these decisions without adequate knowledge

results in failure to meet service recipients' needs and could lead to stress and moral conflicts among healthcare providers. Efforts to strengthen the ethical foundations of the healthcare system should prioritize the needs and expectations of the stakeholders involved in this field.

At the third level, healthcare workers required management skills, including planning, leadership, and supervision. These findings were consistent with the studies conducted by Yusefi and Sadeghi [23], Avijgan *et al.* [19], Abbaszadeh *et al.* [17], and Barati *et al.* [20], which emphasized the importance of management skills for healthcare providers. It is important to highlight that healthcare workers, as representatives of the Ministry of Health in underserved areas, not only fulfill their specialized roles but also require management capabilities. They need to possess the ability to plan, lead their sub-groups, and supervise their respective areas. This need is particularly prominent in healthcare organizations responsible for preserving, providing, and maintaining health, promoting health, and controlling and preventing diseases. The managers of health systems have significant responsibilities beyond general management duties, such as planning, organizing, directing, controlling, innovation, motivation, and coordination. They must also respond to the health and treatment needs of the population, strive to save lives or improve health, and adapt to changes and developments in the field. In such an environment, management skills are of utmost importance and played a vital role in ensuring efficient and effective healthcare delivery. Healthcare managers have to possess the necessary skills to coordinate resources, budgeting, and other critical tasks while also addressing the dynamic nature of healthcare and the evolving needs of the population. These skills are essential for healthcare workers to successfully navigate the complexities of the healthcare system and contribute to the overall well-being of the community.

At the third level, healthcare workers required specialized skills, including specialized knowledge and skills in health and treatment. The findings of this research are in line with those of Hosseini Alimardani [27], Dargahi *et al.* [32], Kabir *et al.* [5], and Modiri *et al.* [16], who emphasized the importance of specialized skills for healthcare providers. Unlike many other fields and organizations that may not require high levels of specialized skills and knowledge, the field of health and treatment demands a strong foundation in specialized knowledge and skills. The ability to work with precision and expertise is crucial for physicians, nurses, and midwives to effectively carry out their roles in the healthcare system. Without the necessary specialized academic knowledge and skills, it would be impossible for healthcare workers to perform their duties competently. Furthermore, due to the constant advancements in medical technology and practices, continuous training and education for healthcare workers are of utmost importance. Healthcare workers have to constantly expand their knowledge, enhance their skills, and stay up-to-date with the latest developments in the field of health. The nature of the healthcare profession necessitates a commitment to lifelong learning and ongoing professional development. Therefore, it is evident that healthcare workers require specialized skills in health and treatment to provide high-quality care and keep pace with the evolving landscape of healthcare. These specialized skills enable healthcare professionals to deliver effective and evidence-based interventions, contribute to improved patient outcomes, and meet the ever-changing needs of the individuals and communities they serve.

The second level of the model highlighted three key requirements for healthcare workers: familiarity with rules and regulations, the ability to make decisions and solve problems, and teamwork. This level acts as an intermediary between the foundational infrastructure level and the superstructural level. The first requirement is familiarity with healthcare laws and regulations. Healthcare workers are entrusted with specialized health treatment missions while also assuming organizational roles. Consequently, knowledge of regulations and treatment protocols is essential. Although many physicians in specialized hospitals may not have direct organizational and managerial responsibilities within the Ministry of Health, healthcare workers have micro-level managerial duties. Therefore, familiarity with health and treatment laws is imperative. This finding was consistent with that of Abbaszadeh *et al.* [17] and Dehghani *et al.* [18].

The ability to make decisions and solve problems was another crucial educational need for healthcare workers at this level. Problem-solving is a fundamental skill in today's professional environment, and decision-making carries significant risks in the health profession. Thus, it is essential to develop decision-making skills and employ effective strategies, particularly for healthcare workers. They encounter unique challenges specific to their work environment in addition to the existing societal problems. Problem-solving skills and knowledge-based decision-making are expected behaviors of healthcare workers, and cultivating these skills should commence during their educational journey. Due to the complexity of patients' conditions and the rapid changes in their health status, healthcare providers have to make quick decisions within limited time frames. Competency in decision-making is crucial for healthcare providers. This finding was supported by the research by Dargahi *et al.* [32], Abbaszadeh *et al.* [17], and Barati *et al.* [20].

The third essential training requirement for healthcare workers at the second level was teamwork. This finding was aligned with that of Abbaszadeh [17], Dargahi *et al.* [32], and Barati *et al.* [20].

In today's complex world, most work, especially within organizational settings, is accomplished through teamwork. Teamwork is a professional competency that individuals in all fields, including healthcare, should possess. Those who are unable to collaborate effectively missed out on the professional growth that could be fostered by team members and colleagues. Moreover, they are unable to undertake many projects that are exclusively carried out as a team. This is particularly relevant for healthcare workers who need to interact and cooperate with other members of the health and treatment team to fulfill their roles effectively. Thus, teamwork skills are essential for healthcare workers.

At the first level of the model, there were three educational needs, including communication skills, the ability to handle information in the Internet environment, and responsibility and work conscience. The second educational need was the ability to handle information in the Internet environment. Our findings were in line with those of Atash Bahar *et al.* [33] and Khoshbaten *et al.* [31]. In today's digital age, information and communication technologies, particularly the Internet, have become essential for individuals in various professions. Healthcare workers are no exception. While not all healthcare workers may have direct access to higher-level specialists or comprehensive medical resources, the Internet serves as a valuable tool to address various medical and non-medical issues. For healthcare workers, the Internet could provide access to up-to-date and relevant information that may not be readily available through traditional means. When encountering unfamiliar symptoms or medical conditions, the Internet could serve as a resource for understanding and diagnosing the situation. Additionally, healthcare workers who may be unfamiliar with legal procedures or regulations could quickly find the necessary information online to address medical or health-related issues.

Furthermore, the Internet plays a crucial role in specialized fields. As knowledge and advancements in the medical field evolved rapidly, healthcare workers have to stay updated to provide the best possible care. The Internet offers a vast array of resources for continuous learning and professional development. It allows healthcare workers to access the latest research, guidelines, and best practices, enabling them to enhance their specialized knowledge and skills. Thus, the ability to handle information in the Internet environment is an essential educational need for healthcare workers. It empowers them to address medical challenges, stay informed about current practices, and adapt to the ever-evolving landscape of healthcare. By utilizing online resources effectively, healthcare workers can enhance their decision-making abilities, provide quality care, and continuously improve their professional capabilities. Responsibility and work ethic were identified as significant educational needs among healthcare practitioners at the primary level. These findings aligned with previous research conducted by Khoshbaten *et al.* [31] and Abbaszadeh *et al.* [17], which underscored the paramount importance of responsibility in healthcare practice. The explanation for this result lies in the nature of the work of medical professionals, especially that of doctors, who are essentially entrusted with the well-being and lives of people, especially those who are economically disadvantaged. It is worth noting that a significant portion of the target population of healthcare workers may not possess a comprehensive understanding of their entitlements in the realm of health. Consequently, the sense of responsibility exhibited by healthcare practitioners has a critical role in the fulfillment of their assigned duties.

This study was conducted exclusively on healthcare workers in Iran. Therefore, given the qualitative nature of the research, caution should be exercised when generalizing the findings to healthcare workers in other countries. This research was exclusively conducted on healthcare workers within the Ministry of Health. Hence, the generalization of its results to other departments, such as physicians in the field of treatment, nurses, or dentists, should be approached with caution. The complexity of responding to self-interactive questionnaires was also recognized as one of the research challenges.

Given that ethical considerations, responsibility, and work conscience are proposed as fundamental concepts required for healthcare workers, it is anticipated that in the recruitment of healthcare professionals, their moral competencies will be assessed in addition to their scientific proficiency. To address the educational needs of healthcare workers, it is recommended to offer specialized knowledge and skills through scientific retraining courses. As communication skills emerged as one of the educational needs in this study, it is expected that the recruitment and hiring process for healthcare workers will consider communication skills as essential. Moreover, providing communication skills courses can further enhance this skill for healthcare workers after they have been recruited and hired. In light of the educational requirements for general skills, such as teamwork, problem-solving, and decision-making, it is expected that these concepts will be integrated into the curricula of medical sciences universities to train and prepare suitable individuals for the role of healthcare workers.

Considering that the ability to access and retrieve information from the Internet is one of the key skills required for healthcare workers, the selection process for this profession should ensure that candidates possess the minimum technological prerequisites, including the ICDL certificate.

Three key levels of educational requirements were found. At the foundational level, specialized skills were highlighted, emphasizing the importance of

advanced knowledge and expertise in healthcare. The intermediate level underscored the significance of familiarity with healthcare laws, decision-making skills, and effective teamwork, all essential for navigating the complex healthcare environment. At the fundamental level, communication skills, Internet information management, and a strong sense of responsibility were identified as foundational requirements for healthcare workers. The ISM model categorized these needs into four distinct groups, providing insights into their interdependencies and influences. The MICMAC analysis emphasized the influence and dependence of each educational need, revealing their intricate relationships.

Conclusion

This research contributes valuable insights into healthcare education in Iran, enabling policymakers and institutions to enhance educational programs for healthcare professionals. The study emphasizes the importance of specialized skills, effective communication, ethical conduct, and a strong sense of responsibility in developing competent healthcare workers, particularly in underserved areas.

Acknowledgments: We would like to thank all the participants who made this study possible, and we would like to acknowledge the use of ChatGPT, a language processing model developed by OpenAI, to assist in the grammatical improvement of this manuscript.
Ethical Considerations: No ethical approval was sought as this is a secondary data analysis.
Conflicts of Interests: The authors declared that they have no conflicts of interests.
Authors' Contribution: Mansoori S (First Author), Methodologist/Main Researcher/Discussion Writer/Statistical Analyst (40%); Mahdavi F (Second Author), Introduction Writer/Assistant Researcher (20%); Behjati Ardakani F (Third Author), Assistant Researcher/Statistical Analyst (15%); Bagheri F (Fourth Author), Methodologist/Original Assistant Researcher (15%); Niroumand Sarvandani M (Fifth Author), Introduction Writer/Discussion Writer (10%).
Funding/Support: Nothing to be reported.

References

1- Sajadi H HM, Dehghani A, Khodayari R, Zandiyan H, Hosseini H. The policy analysis of iran's health transformation plan in therapeutic services. Hakim. 2018;21(2):71-88. [Persian]
2- Raeisi AR, Shaarbafchizadeh N, Aghdak P, Fouladi Z. Outcomes of health care reform implementation in slum areas of isfahan: A qualitative study. J Health Based Res. 2019;5(1):81-100. [Persian]
3- Davari F, Sajadi HS, Ehsani-Chimeh E, Alimohammadzade K. Incentive policies for the retention of physicians and nurses in deprived areas of the Islamic Republic of Iran. Health Inform Manag. 2020;17(4):159-66. [Persian]
4- Abedi G, Soltani Kontai SA, Marvi A, Mazidi S, Abedini E, Abbasi Chaleshtary A. SWOT analysis of health reform plan on healthcare sector from the stakeholder perspective. J Mazandaran Univ Med Sci. 2018;28(166):199-212. [Persian]
5- Kabir MJ, Ashrafian Amiri H, Rabiee SM, Momtahen R, Zafarmand R, Nasrollahpour Shirvani SD. Educational needs of family physicians and health care providers working in the family physician program of Iran. Med Educ J. 2018;6(2):13-21. [Persian]
6- Karimi M, Mirzaei M, Rahim Z. Educational needs of family physicians in Yazd province. J Med Educ Dev. 2012;6(1):39-46. [Persian]
7- Motlagh ME, Nasrollahpour Shirvani D, Maleki MR, Salmani Nodoushan I, Dehnavieh R, Hekmat N. Need assessment about managerial education in managers and chief experts of Health Vice-Chancellery of Medical Sciences Universities in Iran. J Community Health Res. 2013;1(3):166-75. [Persian]
8- Almalki A, Park YS, Tekian A, editors. Needs assessment for interprofessional education: implications for integration and readiness for practice. Healthcare (Basel). 2021;9(4):411.
9- Boakye MD, Owek CJ, Oluoch E, Atakora SB, Wachira J, Afrane YA. Needs assessment of community health workers to enhance efficient delivery of their services for community case management of malaria in Kenya. Malar J. 2021;20(1):102.
10- Barghouti F, Halaseh L, Said T, Mousa AH, Dabdoub A. Evidence-based medicine among Jordanian family physicians: Awareness, attitude, and knowledge. Can Family Physician. 2009;55(7):e6-13.
11- Garcia-Ortega I, Kadlec H, Kutcher S, Hollander M, Kallstrom L, Mazowita G. Program evaluation of a child and youth mental health training program for family physicians in British Columbia. J Can Acad Child Adolesc Psychiatry. 2013;22(4):296-302.
12- Kheirabadi G, Asadi M, Niroumand Sarvandani M, Jamshidi A, Mahdavi F. Risk and protective factors affecting drug craving among patients with substance use disorders undergoing opioid agonists maintenance therapy. Subst Use Misuse. 2023;58(13):1742-50.
13- Shahmahdi N, Ghoreishi B, Aslani H, Ghaffarifar S, Shaker Khatibi M, Mosaferi M, et al. Educational need assessment for empowering health and environmental specialists.IranJHealthEnviron.2022;14(4):577-614.
14- Baghaei S, Rajaei E, Shokouhi A, Hasanian A, Ehterami A, Sahraee M. Investigation of priorities and needanalyses of instructional programs for g.p. subjected to continuous retraining courses in Ahvaz. Educ Dev Judishapur. 2019;10(2):104-14. [Persian]
15- Asadi P, Dokht MH, Siboni VS, Jobaneh M, Ziabari SMZ. Educational needs assessment among prehospital emergency personnel of rasht emergency medical service in 2019-2020. Iran J Emerg Med.8(1):e44.
16- Modiri FK, Ghasemi R, Shams M, Alavinia SM. Assessment of the educational needs of general practitioners working in the deputy health and treatment departments of the ministry of health, treatment and medical education from their own point of view. J Med Spiritual Cultivation. 2017;21(2):40-4. [Persian]
17- Abbaszadeh MNN, Nikbakht AR, Vaskooi Ashkevari K. Assessing educational needs of nurse managers affiliated to state hospitals. IJNR 2010;4(15):16-24. [Persian]
18- Dehghani H, Dehghani K, Nasiriani K, Dehghani A, Banaderakhshan H. Educational need assessment of nursing personal of Shahid Sadoughi university of medical sciences using delphi method in Yazd. J Med Educ Dev. 2013;7(4):73-83.

19- Avijgan M, Karamalian H, Ashourioun V, Changiz T. Educational needs assessment of medical school's clinical faculty members in Isfahan university of medical sciences. Iran J Med Educ. 2009;9(2):93-103.
20- Barati O, Bastani P, Abhari SA. Educational needs assessment for employees in outpatient department: A case of Motahari and Imam Reza Centers. Interdisciplinary J Virtual Learn Med Sci. 2014;5(4):37-44. [Persian]
21- Sarvandani MN, Moghadam NK, Moghadam HK, Asadi M, Rafaiee R, Soleimani M. The effectiveness of mindfulness-based stress reduction (MBSR) treatment on anxiety, depression and prevention of substance use relapse. Int J Health Stud. 2021;7(2):12-6. [Persian]
22- Hojat M. Need assessment of nursing personnel of jahrom university of medical sciences using delphi technique in 2008. Iran J Med Educ. 2011;10(4):464-73.
23- Yusefi AR, Sadeghi A. A study on the educational needs of the managers of Shiraz hospitals in relation to management skills. J Health Based Res. 2017;3(2):175-86. [Persian]
24- Jannati N, Ameri A, Salmanizadeh F. Assessment of the most important educational needs of nursing staff: A case study. Nurs Midwifery J. 2020;18(9):722-31. [Persian]
25- Zeraatchi A, Zeraati M, Samieerad F, Rostami M. Needs assessment of continuing education programs for nursing staff working in Zanjan university of medical sciences. Res Med Educ. 2021;13(1):72-9. [Persian]
26- Raispour K, Ahmady S, Mirmoghtadaie Z. Improving the quality of care and professnional functions with needs assessment and educational prioritization of nursing managers in hospitals of Shahid Beheshti University of Medical Sciences. Nurs Midwifery J. 2021;19(5):430-7. [Persian]
27- Hosseini Alimardani F. Assessment training needs of psychiatric ward nurses in educational hospitals at Ahwaz university of medical sciences. Educ Dev Judishapur. 2019;9(4):217-28. [Persian]
28- Sadrizadeh B, Malekafzali H. Primary health care experience in Iran. Iran Red Crescent Med J. 2004;7(1):79-90. [Persian]
29- Malekafzali H. Primary health care success and challenges in Iran. SJSPH. 2014;12(2):1-10. [Persian]
30- Sarvandani MN, Asadi M, Khosravi F, Gearhardt AN, Razmhosseini M, Soleimani M, et al. Validation and psychological properties of the Persian version of DSM 5 Yale food addiction Scale 2.0 (PYFAS 2.0) in non-clinical population. Addict Health. 2022;14(3):175-84.
31- Khoshbaten M, Ghaffari R, Salek F, Amini A, Hasanzadeh S, Gholanbar P. Educational needs assessment of faculty members of Tabriz University of Medical Sciences, Tabriz Iran. Res Dev Med Educ. 2014;3(1):15-20.
32- Dargahi H, Eskandari M, Shaham G. Comparing current organizational culture and desirable organizational culture from executive managers' point of view in hospitals of Tehran Medical Sciences University. J Coll Tehran Univ Med Sci. 2010;4(1/2):72-87. [Persian]
33- Atash Bahar O, Rajaiyan F, Bahrami M, Garai H, Homayuni A, Ataollahi F. Educational needs of the staff of teaching hospitals in Yazd to establish clinical governance. Health Manag. 2014;5(1):69-78. [Persian]