

# Developing Minimum Dataset For Electronic Health Record In Iran

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## Research Article

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# Abstract

**Background:** Health information system is an integral part of the health system that has a vital role in increasing the efficiency of the health system, especially in primary health care settings. This study was conducted to determine the minimum dataset required in the electronic health record within the health system of Iran as a lower middle income country.

**Method:** This study combines qualitative and quantitative methods. It includes three main stages: reviewing the theoretical foundations of research, designing the main framework for interview questions, conducting a qualitative study by interviewing 42 managers of the health system across the country to determine the minimum dataset in the electronic health. Interviews were carried out from 2020 to 2021. The validity of data was assessed by Delphi method using SPSS 15 software.

**Results:** After reviewing the minimum dataset in the electronic health records of seven countries, 7 main concepts and 23 sub-concepts were extracted from the interviews with experts across the country. Accordingly, 159 information elements were surveyed and a two-round Delphi provided 145 information elements in seven categories of children's program, mothers' program, mental health, elderly, paraclinical services, drug program, and vaccination.

**Conclusion:** Health systems in different countries determine the minimum dataset required in health care setting based on their demographic and epidemiological needs, which can facilitate access to accurate and unambiguous information.

## Background:

Primary health care is the mainstay of the health care system and primary caregivers need reliable and comprehensive information to coordinate their activities(1). In every country, the health information system (HIS) as a key component of the health system is used to formulate and monitor policies, evaluate effects, and determine priorities (2, 3). Designing national health information infrastructure plays an important role in increasing the quality of data and health knowledge (4). A key step in reforming the HIS is identifying information on a series of data that are meaningful, pragmatic, and appropriate to a country's situation (5). A major factor that decreases the efficiency of health care organizations is the lack of shared information between health care buyers and users. (6). In general, the development of e-health care system in developed countries dates back to two decades ago, and there are extensive experiences of its application, especially in health and primary health care(7). Currently, the need to create an Electronic Health Record (EHR) has been stressed in all health care systems. The foundation of the EHR is a health record that contains information of patients referring to health care centers, hospitals, and physicians' offices. The major factors in designing an electronic health record are the type of data, the scale of data collection, the responsibility for data collection, and the purpose of reporting this data (8). Minimum Health Data Sets (MHDS) represents a minimum of variables related to a person's health status, including demographic-clinical data and patient care plans, which facilitate

proper communication between health care providers as well as timely decision-making for managers (2). In Iran, attempts were made to create a centralized system that provides all information required at different management levels in a single software, including IEHS (Iranian Health System), the comprehensive software for all Iranian hospitals (Takfab project), an electronic file project )Shahab Health( (9). Despite high costs of this project for various reasons such as centralized management and monopoly, limited work experience of contracting companies in the health sector Failure failed (10) However, it should be noted that the establishment of such a system requires the creation of integrated infrastructure based on the social and cultural conditions of the country as well as the ability to exchange information at different levels of service delivery (11). Therefore, designing and determining the minimum dataset is a major step in developing a national information registration system that allows medical institutions to identify their patients, meets government requirements and internal needs, and ultimately satisfies the medical community (12).

Since the current health system collects information from different areas (health, treatment, and insurance) in a dispersed and non-integrated manner, it is necessary to determine the standard data elements to improve the design of EHRs. Given the importance of primary health care information system in increasing efficiency, the rational use of health resources, reduced health care costs, improved quality of primary health care, higher satisfaction of patients and ultimately enhanced community health, the present study aims to determine the minimum dataset required to design a health care information system in Iran. The findings of this study can offer valuable experiences to other countries that deal with the same problems in their health care systems.

## **Methods:**

This study, which uses a combination of qualitative and quantitative research, was conducted from 2020 to 2021. The study steps are as follows:

In the first step, valid databases such as PubMed, Science Direct, SID, and Google Scholar were searched using various combinations of keywords such as electronic health records, primary health care, outpatient care, health information technology. Then, information on minimum dataset in HIS was obtained from seven leading countries in the design and implementation of e-health records, including the United States, Canada, the United Kingdom, Australia, Turkey, Malaysia, and Iran. Accordingly, the minimum dataset was extracted from in each country.

Accordingly, using the comparative matrix, the similarities and differences of the minimum dataset were identified in the selected countries and interview questions were designed accordingly. The interviewees were selected from among experts with at least 5 years of experience in the field of HIS at national level. In addition, experts needed to have a research background in technology or be a member of the headquarters or technical units of health information technology and health deputy of the Ministry of Health or medical universities for least two years. The participants were selected using snowball sampling method.

For the interviews, first the interviewees were reached by phone or received a text containing the letter of introduction for research. The research title, purpose and confidentiality of information were explained to participants in person. Accordingly, 24 face-to-face interviews were conducted, 12 via telephone and 6 via email. All interviews were recorded and then transcribed. On average, each interview lasted between 30 and 60 min. All interviews were conducted personally by the researcher.

The content validity of the interview questions was confirmed based on the opinions of experts in this field. During the interview, the researcher noted down a summary of the contents and ambiguous items. The notes were then corrected or modified, especially their key points. Immediately after each interview, the dialogues were transcribed. For data analysis, a five-step framework analysis method was used , which included identifying a thematic framework, indexing, drawing tables, drawing maps, and interpreting (13). Data analysis began from the first interview and continued along with other interviews. The interview texts were read several times to gain an overview of the materials, and then the text was read line by line to gain a general ideal of the structure of sentences. From the outset, the first level was coded, which involved extracting the analytical units from answers to the questions, Semantic units were extracted from main concepts in the analysis units and a code was assigned to each semantic unit. After comparing the codes, a list of main and sub-codes was obtained. In the second level of coding, the primary and secondary codes were read and then the primary codes that had the same meaning were classified to form classes.

To ensure the accuracy of the qualitative findings, four criteria (validity or acceptability, reliability or similarity, transferability and verification) proposed by GABA and Lincoln were considered. The researcher attempted to ensure that the findings reflect the real experiences of participants (15).

In the third stage, the validity of the proposed minimum dataset was assessed using the Delphi technique based on the opinions of 76 experts in this field. Experts had at least one year of work experience in the Ministry of Health, were member of the headquarters or technical units of health information technology or faculty members at the departments of health information management in various universities of medical sciences. Finally, the Likert-type questions were developed based on the results of the qualitative section and sent to the observers in person or by e-mail along with an introduction to the goals of research. The participants were asked to write their comments in the questionnaire or submit their ideas as a corrective proposal in cases they did not agree with one of the concepts or components. In the end, the questionnaires were collected and analyzed. Each data element, relative to its importance, received a value of 0 to 100. Following the assessment of experts and analysis of data, options that gained less than 80% of the total points (out of 159 suggested elements, 19 did not attain the required points) were re-examined based on suggestions, and then the newly developed questions were sent for re-examination. Ultimately, 145 data elements were approved by experts. The results of this step were analyzed by SPSS15 software.

## **Results:**

Based on the findings of the comparative study, the minimum health information dataset of seven countries including the United States(14), Canada(15), the United Kingdom(16), Australia(17), Turkey(18), Malaysia(19), and Iran are listed in Table 1:

Table (1) The minimum dataset of electronic health records information in the selected countries

Table (1) The minimum set of electronic health records information data in the countries under study

	USA	England	Canada	Australia	Turkey	Malesia	Sib	Sina	Nab
Immunity	✓	✓	✓	✓	✓	✓	✓	✓	✓
mental health	✓	✓	✓	✓	✓	✓	✓	✓	✓
elderly care	✓	✓	✓	✓	✓	✓	✓	✓	✓
mother and child information	✓	✓	✓	✓	✓	✓	✓	✓	✓
radiological information	✓	✓	✓	✓	✓	✓	✓	✓	✓
radiological information	✓	✓	✓	✓	✓	✓	✓	✓	✓
pharmaceutical information	✓	✓	✓	✓	✓	✓	✓	✓	✓
drug and alcohol information	✓	✓	✓	✓	✓	✓	✓	✓	✓
cancer information	✓	✓	✓	✓	✓	✓	✓	✓	✓
demographic information	✓	✓	✓	✓	✓	✓	✓	✓	✓
personal identification and allergy	✓	✓	✓	✓	✓	✓	✓	✓	✓
nutrition of infants	✓	✓	✓	✓	✓	✓	✓	✓	✓
housing	✓	✓	✓	✓	✓	✓	✓	✓	✓
Housing household	✓	✓	✓	✓	✓	✓	✓	✓	✓
adoption information	✓	✓	✓	✓	✓	✓	✓	✓	✓
juvenile delinquency	✓	✓	✓	✓	✓	✓	✓	✓	✓
disease prevalence and homelessness	✓	✓	✓	✓	✓	✓	✓	✓	✓
Child care	✓	✓	✓	✓	✓	✓	✓	✓	✓
protection information	✓	✓	✓	✓	✓	✓	✓	✓	✓
Disability services Data	✓	✓	✓	✓	✓	✓	✓	✓	✓
mortality Data	✓	✓	✓	✓	✓	✓	✓	✓	✓
Buy Home	✓	✓	✓	✓	✓	✓	✓	✓	✓
Spinal cord injury	✓	✓	✓	✓	✓	✓	✓	✓	✓
Administrative and billing	✓	✓	✓	✓	✓	✓	✓	✓	✓
critical insurance	✓	✓	✓	✓	✓	✓	✓	✓	✓
Women Genital problems	✓	✓	✓	✓	✓	✓	✓	✓	✓
Social services	✓	✓	✓	✓	✓	✓	✓	✓	✓
Emergency data	✓	✓	✓	✓	✓	✓	✓	✓	✓
Infectious Diseases data	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sexual identity data	✓	✓	✓	✓	✓	✓	✓	✓	✓
Gender and sexual	✓	✓	✓	✓	✓	✓	✓	✓	✓
environmental care data	✓	✓	✓	✓	✓	✓	✓	✓	✓

Common items in the electronic health files of the above countries included immunization, mental health, the elderly, maternal and infant care, and demographic information. Generally provided at the primary health care level, these services exhibit the importance of these cases in health promotion.

Table 2 shows the general characteristics of the subjects participated in the qualitative phase.

Table 2: General profile of the participants in the interview

	Demographic characteristics	Percentage
Sex	Male	59.52%
	Female	40.47%
Level of education	Bachelor's degree	50%
	MA degree	8%
	PhD and above	42%
Work experience	5-0 years	34%
	10-6 years	16%
	More than 10 years	50%

At this stage, 42 subjects were interviewed, including 25 men and 17 women, 14 health program managers, 12 experts at the health deputy of the Ministry of Health, and 16 experts from medical universities. After data transcription and analysis to identify managers for the supplementary interview, 7 main concepts and 23 sub-concepts consisting of 159 information elements were obtained. The results are shown in Table 3.

Table 3: Primary and sub-concepts of minimum electronic health record dataset based on the opinions of experts in the qualitative phase

Table 3 Basic and sub-concepts of at least electronic health record data set based on expert opinion in qualitative phase

Information elements	(Sub-themes)	(Themes)	
Body temperature	Vital signs	Children's program	
Pulse			
level of consciousness			
Number of breaths			
Name and surname of the child	Individual profile		
Parents' first and last names			
National Code			
place of birth			
Address			
Phone number			
Mother's age			
Type of nutrition			
Nutritional supplement type			Nutrition
Type of delivery			Biography (client information)
Place of birth			
Childbirth rank			
Investigating dental problems in children			
disease background			
Vaccine history			
Care Date			
Child height			
Baby weight			
Around the baby's head			
History of drug use	Individual profile	"Mothers' program"	

Information elements	
to cry	
Type of feeding	
Eye movements	
body movements	
Baby hearing	
Baby talk	Biography (client information)
Mother's name and surname	
National Code	
Date of birth	
Address	
Type of insurance	
Mother's job	
Wife's job	
number of children	
Weight	
Height	
BMI	
EDC	
LMP	
disease background	
History of illness in spouse or children	
Surgical history	
History of abortion	
Twin history	
Pharmaceutical history	
Hospital history	
History of previous deliveries	Oral health
Care Date	mental health

Pulse		
blood pressure		
Information elements		
Body temperature		
Pulse	Nutrition	<b>Mental health</b>
level of consciousness	Education	
Number of breaths	Individual profile	
Name and surname of the child		
Parents' first and last names		
National Code		
place of birth	Biography (client information)	
Address		
Phone number		
Mother's age		<b>(Themes)</b>
Type of nutrition		<b>Mental health</b>
Nutritional supplement type	Under the concept	
Type of delivery	(Sub-themes)	
Place of birth		
Childbirth rank	Biography	
Investigating dental problems in children		<b>Elderly</b>
disease background	Education	
Vaccine history	Individual profile	
Care Date		
Child height		
Baby weight		
Around the baby's head		
History of drug use		

Information elements	
to cry	Nutrition
Type of feeding	<b>Para clinic</b>
Eye movements	mental health
body movements	Education
Baby hearing	
Baby talk	Individual profile
Mother's name and surname	
National Code	
Date of birth	
Address	Under the concept
Type of insurance	(Sub-themes)
Mother's job	Individual profile
Wife's job	Biography (client information)
number of children	
Weight	
Height	
BMI	
EDC	<b>Drug program</b>
LMP	
disease background	
History of illness in spouse or children	
Surgical history	
History of abortion	Individual profile
Twin history	Biography
Pharmaceutical history	
Hospital history	
History of previous deliveries	
Care Date	

Pulse	
blood pressure	
	<b>Vaccination</b>
Information elements	
Body temperature	
Pulse	

There were 76 subjects in the Delphi stag including 28 women and 48 men of whom 25 had work experience in the Ministry of Health, 30 were members of technical units of health information technology, and 21 were faculty members of health information management departments at various universities of medical sciences.

In the first round, 19 items that had not obtained the required points were modified at the discretion of the research team and finally included in the survey.

17 items related to the source of income - amount of income, and existence of support programs, educational backgrounds in the main subgroup of the elderly - skin and eye color that indicates problems or illness, history of Jaundice in the main subgroup of children - maternal support programs, history of alcohol consumption, educational background in the main subgroup of mothers, the position of the drug-prescribing person from the main para clinical subgroup, and the pharmacy in electronic referral, as well as the position of the drug-prescribing person in the main subgroup of medicine - source of income - and educational background were removed from the main mental health subgroup.

Three items of the history of spousal or children disease in the main group of mothers, the history of smoking in the main group of mental health and the serial number of vaccines in the main vaccination group were added to the list based on the participants' feedback. Finally, 145 data elements were approved in the second round of Delphi.

## Discussion:

This study was conducted to determine the minimum dataset required in the electronic health record in the health system of Iran. Datasets provide a tool for recording the most relevant and up-to-date facts about a patient's health information. Therefore, such data provides valuable information for policymakers, health care professionals, and stakeholders that should be readily available to care providers(20). A review of the minimum dataset used in the seven countries studied revealed that the information in the e-health file is used on a case-by-case basis, depending on the country's geopolitical and health conditions.

In general, the minimum dataset used in these seven countries manifested a strong emphasis on primary health care, which highlights the potentials of this type of care on health promotion, cost-effectiveness, and assurance of its effectiveness (21).

In developed countries (e.g. USA, Canada, UK and Australia), primary health care is concerned with the second and third health care, which is effective in designing a set of minimum datasets required for electronic health records (22). In developing countries (e.g. Turkey, Malaysia and Iran), e-health records are chiefly at the primary health care and unrelated to the specialized levels (23). The Sib, Sina and Nab systems in Iran were designed based on primary health care service package provided by the Ministry of Health in 1995, which utilized the minimum standards in the content structure. There is a major difference between these systems in terms of the information they contain (standardized texts such as text fields) and how they interact with the software (2) According to the research findings, the minimum dataset in different registration systems falls in different categories (39).

Demographic information is of high priority in all information systems under study, which reflects the importance of such information in the e-health record (24)

The sources and amount of income in all three groups of mothers, the elderly and mental health were not confirmed, which could be explained in terms of cultural sensitivity of people to expressing their income in Iran.

All recommendations in the vaccination section were finalized, which indicates familiarity with the program and its long history in the health system. Given that children vaccination is one of the primary measures taken by the World Health Organization to eliminate pediatric diseases, it is also strongly emphasized in the Iranian health system (25). In all age groups, one of the main elements in the history of vaccination was that interviewees admitted that the Sib system, which is used nationally, does not contain information required by the vaccination program. Darabi et al. studied the design of a minimum dataset required for children. The vaccination data documented in the e-health records of the United States, Australia, Canada, and Iran was consistent with the data finalized in this study(26).

There were 33 items in the main concept of children of which 91% were confirmed. In all countries studied, children's health program is one of the main components of the electronic health record. From the perspective of interviewees, it is necessary to record all information about children since their birth. Childcare is one of crucial aspects of health care and has all the characteristics of priority selection in executive programs (27). Darabi et al. in a minimum dataset for children's appetite provided 146 data elements. All of the data elements approved in their study are consistent with the data obtained in the present study (26)

Maternal health programs are a major part of the study program in seven countries. Since mothers and babies are considered as vulnerable groups in the society, maintaining and improving their health is the most basic element of health care in any country and one of the major indicators of health in sustainable

development of maternal mortality index (27). Cultural issues have a strong impact on influence the removal of items such as income and type of maternal support (28, 29)

18% of items were removed from the original version of of mental health. As reported by the World Health Organization (WHO) in 1990, of 10 main diseases that caused disability in the world, five were related to mental illness(30). It is mainly rooted in the misguided view as well as the irrational attitude of people, experts and political and health policymakers in the field of mental health, inappropriate structure, lack of financial credits in the Ministry of Health, worn-out primary health care network, and lack of specialized health care and treatment in mental health (31).

The rise of the elderly population and changes in the epidemiological pattern of diseases in middle age and old age to chronic diseases, more attention should be paid to preventive and therapeutic policies to maintain and improve the health of the elderly population (32). In the United States, the United Kingdom, Canada, and Australia, aside from health data, data from other health-related organizations are used to supplement electronic health data. In Iran, this extra-sectorial relationship in electronic health data has not yet been crystalized, and most data are based on people's statements. According to interviewees, information such as insurance type, source and amount of income, and the type of support programs for the elderly should be registered in the elderly health records (33).

93% of items related to the Para clinical section were approved by the participants. Since the family physician program and the referral system have not been implemented in the rural areas of Iran and there is still no connection between level one and level two and three of electronic services, the unfamiliarity of the target group may have affected the elimination of Para clinical information.

## **Conclusions:**

In order to standardize the structure and content for data exchange in the electronic health file of patients in Iran, it is necessary to create a database and a glossary of national health information that explains the professional terms related to health and treatment. The important role of users and their information needs in designing an electronic health record system should be taken into account. Also, a large dataset with a major gap between understanding and interpreting will be confusing. Hence, a minimum dataset of standards can lead to accurate and unambiguous access to the service recipients.

## **Declarations:**

Ethics approval and consent to participate: this research is approved by Ethics Committee of Mashhad University of Medical Sciences (IR.MUMS.REC.1396.77), and required to follow these ethical points:

- 1) Informed consent of all interviewees; written informed consent obtained from of all interviewees 2) Give complete information about the purpose of research to interviewees;
- 3) The comments of interviewees will remain confidential

Furthermore, all methods were performed in accordance with the relevant guidelines and regulations of Mashhad university of medical sciences .

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Availability of data and material: The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

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Authors' contributions: Study concept and design: Hooshmand and meraji . Analysis and interpretation of data: Mahdizadeh. Drafting of the manuscript: meraji. Critical revision of the manuscript for important intellectual content: Estaji, hooshmand. All authors read and approved the final manuscript.

## References:

1. hooshmand E, Zohre Nejatadegan, Hossein ebrahimipour, Mahmoud Bakhshi, Habibollah Esmaili, Ali vafae najar. Rural family physician system in Iran: Key challenges from the perspective of managers and physicians, 2016. Journal International Journal of Healthcare Management 2019;12(9).
2. Ahmadi M DS, Sadoughi F. A Comparative Study of the Proposed Models for the Components of the National Health Information System. Acta Medica Iranica. 2014;22(2):115.
3. Rampisheh Z, Kameli M, Zarei J, Vahedi Barzaki A, Meraji M , A M. Developing a national minimum data set for hospital information systems in the Islamic Republic of Iran. Eastern Mediterranean Health Journal. 2020;26(4).
4. Gattini CH. Improving the structure and performance of National Health Information systems: operational approach and strategic recommendations. Geneva: World Health Organization; 2009. 122 p.
5. Damanabi S, Abdolnezhad S, Karimi Javan G. Situation of Speech Therapy Information Management in Rehabilitation Centers Affiliated with Tabriz University of Medical Science. Journal of Health and Biomedical Informatics. 2015;2(1):17-23.
6. Tomasi E FL, Maia MdF. Health information technology in primary health care in developing countries: a literature review. Bulletin of the World Health Organization. 2014;82(11):867-74

7. Hatef E, Weiner JP, Kharrazi H. A Public Health Perspective on Using Electronic Health Records to Address Social Determinants of Health: The Potential for a National System of Local Community Health Records in the United States. *Int J Med Inform.* 2019;124:86–9.
8. Kharrazi H, Gonzalez CP, Lowe KB, Huerta TR, Ford EW. Forecasting the maturation of electronic health record functions among US hospitals: retrospective analysis and predictive model. *J Med Internet Res.* 2018;20(8).
9. Langarizadeh M, M. G. A Minimum Data Set of Laboratory Reporting System for Exchanging With Electronic Health Record System in Iran. *jha.* 2017;19(66):61-70.
10. Abbasi R, Khajouei R, Mirzaee M. Evaluating the demographic and clinical minimum data sets of Iranian National Electronic Health Record. *BMC Health Serv Res.* 2019;19(450).
11. Chan KS, Kharrazi H, Parikh MA, Ford EW. Assessing electronic health record implementation challenges using item response theory. *Am J Manag Care.* 2016;22(12).
12. WH. H. Meaningful use” of electronic health records and its relevance to laboratories and pathologists. *J Pathol Inform.* 2011;2(1):7.
13. Ali vafae najar, Hossein ebrahimipour, Mohammad reza Shidfar, Reza Khani jazani. Patient education services and the organizational factors affecting them at teaching hospitals affiliated with Mashhad University of Medical Sciences (MUMS), 2008. *Journal of Men's Health.* 2012;9(4):230-7.
14. The Office of the National Coordinator for Health Information Technology. Common Clinical Data Set summary record create. In: *Health IT and Health Information Exchange Basics Official Website of The Office of the National Coordinator for Health Information Technology editor. USA:* <https://www.healthit.gov/providers-professionals/meaningful-use-definition-objectives>; 2018.
15. Chen C, Garrido T, Chock D, Okawa G, Liang L. The Kaiser Permanente Electronic Health Record: Transforming And Streamlining Modalities Of Care. *health affair* 2009;28(2).
16. National Information Board and Department of Health and Social Care. Personalised health and care 2020,Using Data and Technology to Transform Outcomes for Patients and Citizens. 2014.
17. National Health Information Management Group Report on the evaluation of the National Minimum Data Set for Admitted Patient Care. In: *Welfare AloHa, Canberra, editors. Canberra*2003.
18. The National Health Data Dictionary (NHDD) of Turkey v2.0. [cited November 11 Afhwe-sgtdUp.
19. Selvaraju D HIMMEHICMoH. Health Information Management: Malaysian Experience. In: *Health Informatics Center Ministry of Health, editor. Malaysia.*2008.

20. Safdari R, Shahmoradi L, M. E. Minimum data set of anatomical pathology information system from the perspective of experts. *J Payavard Salamat*. 2015;9(3):300-14.
21. Ghaneie M, Rezaie A, Ghorbani N, Heidari R, Arjomandi M, M. Z. Designing a minimum data set for breast cancer: a starting point for breast cancer registration in Iran. *Iran J Public Health*. 2013;42(1):66–73.
22. Jha AK, Doolan D, Grandt D, Scott T, Bates DW. The use of health information technology in seven nations. *Int J Med Inform* 2008;77(12):848-54.
23. Dogac A, Yuksel M, Avci A, Ceyhan B, Hulusi U, Eryilmaz Z. Electronic Health Record Interoperability as Realized in Turkey's National Health Information System. *Methods Inf Med*. 2011;50(2):140–9
24. Birtwhistle R, Keshavjee K, Lambert-Lanning A, Godwin M, Greiver M, Manca D. Building a pan-Canadian primary care sentinel surveillance network: initial development and moving forward. *J Am Board Fam Med*. 2009;22(2):412-22.
25. 2014 NHBNmdNheDdWMoH.
26. darabi M, delpisheh A, Gholami Parizad E, nematollahi M, Sharifian R. Designing the Minimum Data Set for Iranian Children' Health Records. *sjimu*. 2016;24(4):114-25
27. Sadoughi F, Nasiri S, Langarizadeh M. Necessity for designing national minimum data set of perinatal Period in Iran: A Review Article. *medical journal of mashhad university of medical sciences*. 2014;57(5):727-37.
28. Ahmadi M, Mohammadi A, Chraghbaigi R, Fathi T, Baghini MS. Developing a minimum data set of the information management system for orthopedic injuries in Iran. *Iran Red Crescent Med J*. 2014;16(7):e17020.
29. Kalankesh LR, Dastgiri S, Rafeey M, Rasouli N, L. V. Minimum data set for cystic fibrosis registry: a case study in Iran. *Acta Inform Med*. 2015;23(1):18–21.
30. noorbala A. Psychosocial Health and Strategies for improvement. *IJPCP*. 2011;17(2):151-6.
31. M. SZ. Some of the Challenges of Mental Health and Addiction in Iran. *IJPCP*. 2011;17(2):161-57
32. Shoaie F, Nejati V. Elderly-Caring Service Pattern in USA Comparing With Iran. *Salmand: Iranian Journal of Ageing*. 2008;3(1):68-77.
33. Mohammadi A, Ahmadi M, A. G. Developing a minimum data set for an information management system to study traffic accidents in Iran. *Iran Red Crescent Med J*. 2016;18(3):e23677.