

Health Information Management System for Elderly Health Sector: A Qualitative Study in Iran

Farahnaz Sadoughi,¹ Mehraban Shahi,² Maryam Ahmadi,¹ and Nasrin Davaridolatabadi^{2,*}

¹Department of Health Information Management, Iran University of Medical Sciences, Tehran, IR Iran

²Department of Health Information Management, Health Information Management Research Center, Hormozgan University of Medical Sciences, Bandar Abbas, IR Iran

*Corresponding Author: Nasrin Davaridolatabadi, Department of Health Information Management, Hormozgan University of Medical Sciences, Bandarabbas, IR Iran. Tel: +98-7633337192, Fax: +98-7633337192, E-mail: davarin@gmail.com; n_davari@hums.ac.ir

Received 2014 July 11; Revised 2014 October 11; Accepted 2014 December 15.

Abstract

Background: There are increasing change and development of information in healthcare systems. Given the increase in aging population, managers are in need of true and timely information when making decision.

Objectives: The aim of this study was to investigate the current status of the health information management system for the elderly health sector in Iran.

Materials and Methods: This qualitative study was conducted in two steps. In the first step, required documents for administrative managers were collected using the data gathering form and observed and reviewed by the researcher. In the second step, using an interview guide, the required information was gathered through interviewing experts and faculty members. The convenience, purposeful and snowball sampling methods were applied to select interviewees and the sampling continued until reaching the data saturation point. Finally, notes and interviews were transcribed and content analysis was used to analyze them.

Results: The results of the study showed that there was a health information management system for the elderly health sector in Iran. However, in all primary health care centers the documentation of data was done manually; the data flow was not automated; and the analysis and reporting of data are also manually. Eventually, decision makers are provided with delayed information.

Conclusions: It is suggested that the steward of health in Iran, the ministry of health, develops an appropriate infrastructure and finally puts a high priority on the implementation of the health information management system for elderly health sector in Iran.

Keywords: Elderly, Management Information System, Hospitals

1. Background

Information managers in health care systems deal with lots of information (1-3). Sometimes, this information is not sufficient for information needs and as a result, little information is truly used for decision making and evaluating health care systems (4, 5). Given the increasing change and development of information in healthcare systems, the dependency to computerized information systems is becoming increasingly inevitable (1, 6). Studies have shown that the lack of access to true and timely data by managers when making decisions has been considered as a challenge faced by primary health care centers (7-12). Even sometimes this issue has had impact on the future planning and national policies of countries (6, 8, 13). Also, some studies regarded the diversity of services and complexity of the environment as other challenges faced by primary health care centers (1, 14-18). A country in which people aged over 65 years account for 4% - 7% of the population is considered as an aging country and a country in which people aged over 65 years account for 14% - 20% of the population is considered as an aged country, as defined by the world health organization (WHO)

(19). The last census by the statistics center of Iran showed that elderly people accounted for 5.7% of Iran population (20). According to WHO reports, Iran will face the aging crisis in future years (19-22). Therefore, the aging crisis sounds alarm bells in Iran. According to statistics, elderly people visit doctors five to seven times higher than the rest of society and more than 60% of medical expenses are spent for the elderly people; so, information management systems are needed in order to support provided services and improve the efficiency in the future decision making (22-24).

2. Objectives

This study aimed to investigate the current status of the health information management system in the field of the elderly health in Iran.

3. Materials and Methods

This qualitative study considered from applied perspective was conducted in two steps. In the first step, all rel-

evant documents from the elderly health department in Iran ministry of health, the secretariat of the national council of the elderly, elderly care research centers, the welfare organization affiliated to the ministry of welfare, the ministry of petroleum were reviewed. In the second step, the study population comprising experts, managers and faculty members, the head of the elderly health department in the Ministry of Health, the head of the secretariat of the National Council of the Elderly, heads of research centers, experts working in the Welfare Organization affiliated to the Ministry of Welfare and the health planning manager of the Ministry of Petroleum were interviewed.

3.1. Sampling

In the first step, total population sampling was applied and all the documents were reviewed. In the second step, a combination of three sampling methods, including convenience, purposeful and snowball sampling (expert sampling) was applied to select interviewees, so that first, favored individuals were selected using purposeful sampling. Then available individuals were interviewed and asked to introduce other experts in this field for the interview. Eventually, the final sample consisted of 10 people based on reaching the data saturation point. No exclusion was occurred because of well-defined purposive sampling with obvious inclusion criteria applying in this phase of study (Tables 1 and 2).

Table 1. Frequency of the Study Participants According to Their Workplace

Participants	Work place
P1, P4, P8	Ministry of Health and Medical Education
P9	National Council of the Elderly
P3, P5, P6	Elderly care research centers
P2, P10	Ministry of Welfare
P7	Ministry of Petroleum

Table 2. Demographic Status of the Study Participants

Variables	Participants	Values ^a
Gender		
Male	P2, P3, P5, P6, P7, P9, P10	7 (70)
Female	P1, P4, P8	3 (30)
Education		
PhD	P3, P5, P6, P8, P10	5 (50)
Master	P4, P2	2 (20)
Others	P7, P9, P1	3 (30)
Job		
Faculty member	P3, P5, P6, P8, P10, P2	6 (60)
Nonfaculty member	P7, P9, P1, P4	4 (40)

^aValues are presented as No. (%).

3.2. Study Setting

The study was conducted in the elderly health department in Iran Ministry of Health, the secretariat of the National Council of the Elderly, elderly care research centers, the Welfare Organization affiliated to the Ministry of Welfare, and the Ministry of Petroleum.

3.3. Data Gathering Instruments

In the first step, a data collection form, developed by the researcher was used and of which items such as entities and the associated data sources, those responsible for decision making and the relationships between them, technologies in use, the data flow, access and distribution of information were extracted. The items of this form were identified based on findings from a literature review. In the second step, a semi structured interview guide as a data gathering tool was used. To develop this guide, an in-depth interview was conducted with three of the most expert (expert refers to key individuals in the related field that can provide an important image of the studied phenomenon) (25) managers in the field of health of the elderly. According to the findings from this step, the research team opinions and the results of the first step, the interview guide was developed. The face, content and structural validity were assessed and confirmed by three experts in the health information management.

3.4. Data Gathering Methods

In the first step, required data were gathered by in-person visits and observation of the settings by the researcher as well as the review of required documents, and entered into the data gathering form. In the second step, to identify the current status of the health information management system in the field of the elderly health, the researcher interviewed the studied people. The interviews were conducted in an informal way by the same person (the researcher) without expressing opinion on the trueness or falseness of answers. The note taking method was also used. At the end of the interview, the contact information of the participant was obtained for further contacts, if required. The interviews varied in length from 45 to 60 minutes (the average interview length was 40 minutes). Interviews continued until data saturation was reached and complementary interviews were conducted, if needed.

3.5. Data Analysis

Content analysis was used to analyze the data through five steps of framework analysis considering: familiarization, identifying a thematic framework, indexing, charting and mapping and interpretation. All the results from the observation and documents reviews which had been entered into the data gathering form were studied. In addition, all interviews were transcribed verbatim and clarified using notes. Lincoln and Guba's evaluative criteria was used in 4 subcategories : Credibility (confidence in the truth of the findings), transferability (showing that

the findings have applicability in other contexts), dependability (showing that the findings are consistent and could be repeated) and conformability (a degree of neutrality or the extent to which the findings of a study are shaped by the respondents and not researcher bias, motivation, or interest) to assess validity and reliability of collected data.

After analyzing the interview transcripts, results were narratively described and coded in four themes by one of the researchers including data documentation, data flow, data analysis and reporting, access and distribution of information in the health information management system for the elderly health sector in Iran. Microsoft Office Word 2007 was applied coding the data because of the limited volume of the transcript and the higher possibility of classifying and coding the data by the researcher experience and diagnosis than the on demand softwares.

3.6. Limitations

This study had some methodological limitations such as its sampling strategy and inability to generalized findings to target population because of the qualitative approach and inability of applying triangulation to increase the generalizability because of the novelty of the topic and lack of experts for designing a quantitative approach.

3.7. Ethical Issues

All the participants were justified about the aims of the study and a voluntary written consent was obtained from the participants before semistructured interviews. It was mentioned that the participants had the right and were able to quit in any stage of the study. Moreover, they were assured that all their verbal comments, sounds and any documents were considered as confidential papers. The code of ethical approval of the study was 1391/338.

4. Results

Demographic data indicated that the average mean for the present participants was 42.8 ± 3.5 . Table 2 showed the other demographic frequencies. The results derived from content analysis were provided in four themes including data documentation, data flow, data analysis and reporting, access and distribution of information in the health information management system for the elderly health sector in Iran.

4.1. Data Documentation in the Health Information Management System for the Elderly Health Sector in Iran

Nine out of 10 (90%) participants noted that in Iran, there is no well-defined health information management system in elderly health sector, so that managers have to obtain information from various sources for gathering and documentation data needed for making decision in the field of elderly health. In this system, completed forms in primary health care centers are an example of these data

sources. All data are gathered manually in primary health care centers through this system. Registration forms include: periodic care forms, referral forms, follow-up forms and feedback forms. The above-mentioned forms are related to those old people who visit primary health care centers. However, the documentation for old people in need of the secondary health care (hospitals and clinics) is as the same as other age groups because there is no separate sector in hospitals for old people and they, like others, are hospitalized in various wards of hospitals. Some data required for decision making by elderly health managers include the elderly demographic data, administrative and financial data, and finally hospitalization data. These data should be attained from various sources and there is no centralized database and managers are given delayed information because of administrative procedures, so that in some cases decisions are made based on inadequate documentation due to long delay. It should be mentioned that in the most parts, the data are gathered manually and there is no system for data documentation.

4.2. Data Flow in the Health Information Management System for the Elderly Health Sector in Iran

The flow of data related to elderly people in Iran primary health care centers is briefly shown in Figure 1. In these centers, after completing forms related to elderly people and, if necessary, referral forms, these forms are filed in the centers and finally sent to the health center of the province. In the all steps, all the forms are of paper and the data flow is done fully manually. Only in the final step, in the health centers of the province, the data related to elderly people are automated and entered into the ministry of health portal (www.port.health.gov.ir).

The data flow of elderly patients seeking the hospital is as the same as of other patients. After the documentation of patients' data in medical records, the hospital statistics offices compile the statistics and send them monthly to the offices of statistics and informatics in related universities. However, the data flow is done fully manually in the centers from which the elderly health information managers receive the data. However, elderly demographic data in some centers are available through the terminal of each center and in most centers, elderly health findings are transferred using paper-based system. Some information related to each center is retrievable by the portal of that center. For example, elderly population demographic information is retrievable by the portal of the registration office and information about individuals referred to primary health care centers throughout the country is also retrievable by the portal of the Ministry of Health. Information about individuals referred to hospitals and clinics are recorded manually but such information is finally retrievable by the portal of statistics office in the Ministry of Health. Information about mortality and the causes is available using death registration system. As a result, in the existing system, the dataflow is not done electronically.

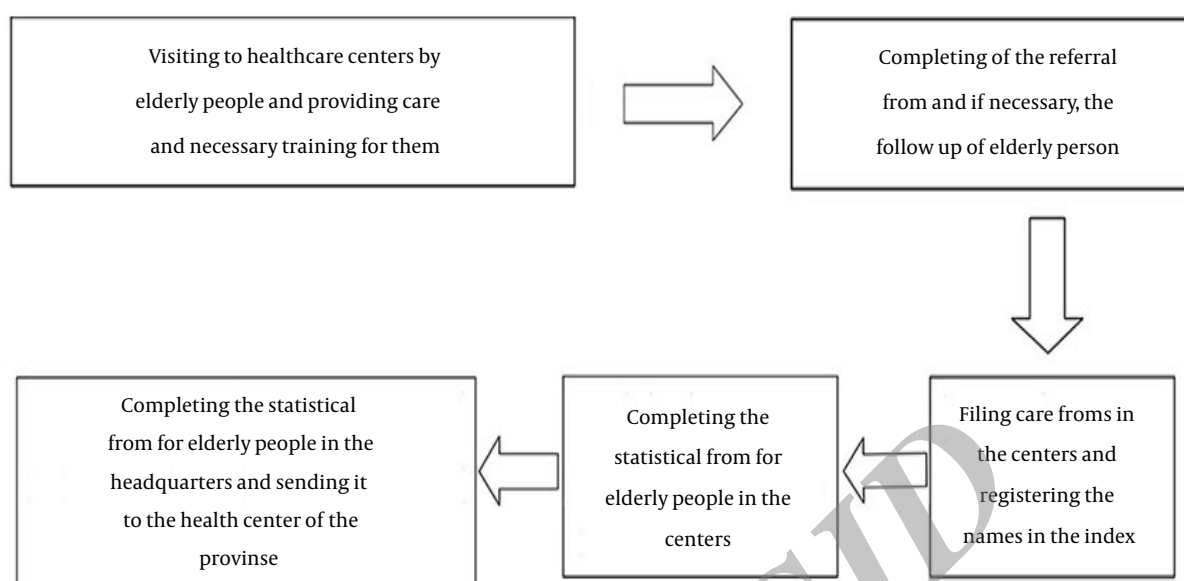


Figure 1. The Flow of Data Related to Elderly People in Iran Health Care Centers

4.3. Data Analysis and Reporting in the Health Information Management System for the Elderly Health Sector in Iran

Eight out of 10 (80%) participants noticed that in the health information management system, the elderly health sector in Iran, at the first level of health care, the collected data are not analyzed in a centralized way due to the fragmentation in the provision of data, delayed data collection and lack of a system to analyze them. The data sent to the health centers of the province, in the case of need, are analyzed manually and published in annals provided at the end of each year. At the second level of health care, the data are analyzed by available software, such as SPSS, in offices of statistics and informatics in universities and provided in annals at the end of each year. In other words, entities responsible for elderly population health develop reports and analyze them separately. The reports and indicators are mainly focused on administrative, financial and managerial issues. Some of these reports in the primary health care centers included: the population of elderly people, the referral of elderly patients, the number of networks implementing programs for elderly people, the number of elderly people receiving care from physicians and the number of elderly people receiving care from non-physician, the number of trained elderly people regarding the persistent information, the number of people who train the elderly people. In addition, the analysis of data collected from hospitals and clinics (the second level of health care) result in developing reports included: burden of disease among elderly population, elderly mortality and cause-specific mortality among them, cost analysis, medication used by the elderly people, brief history of elderly patients, cen-

sus of elderly patients' admissions and discharges from hospitals and clinics, monthly and yearly charts indicating the referral of elderly patients to elderly clinics. Results from the review of documents and the interviews with the experts showed that many of these indicators are calculated manually and there is no system for gathering and calculating them.

4.4. Access and Distribution of Information in the Health Information Management System for the Elderly Health Sector in Iran

All the participants announced that in Iran, the distribution of information in the primary health care centers is mostly manually and rarely automated; i.e. after completing paper forms related to elderly people at the end of each month, they are sent to the primary health care centers of city and then, after collecting the above-mentioned forms from all cities quarterly, they are sent to the headquarters of the province (the group of family health in the province). In all previous steps, the affairs are not automated. However, the headquarters of the province, using the portal of the ministry of health, send the data to the office of elderly health twice a year. In hospitals and clinics, medical records of inpatient and outpatient patients, including the elderly patients, are completed and at the end of each month they are submitted to the offices of statistics and informatics in universities of medical sciences. These steps in hospitals are done through the hospital information system (HIS). In some clinics, some parts of outpatient records (entering demographic information) are done automated. The final report of such information is sent to the office of statistics and information technology in the ministry of health through

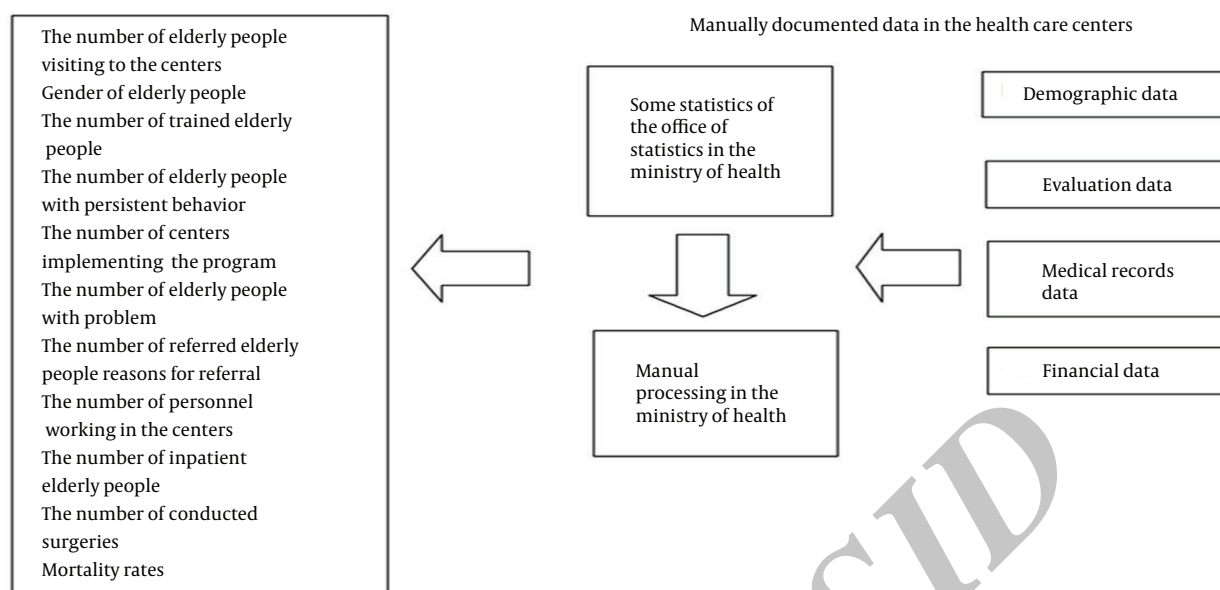


Figure 2. An Overview of the Current Status of the Health Information Management System for the Elderly Health Sector in Iran

the FTP or the portal of the ministry of health. Since there is no health information management system for elderly health sector, managers have no access to the collected reports in a centralized system. However, in some centers, managers of the elderly health sector have access to the internet and virtual and external organizational communications; so, they have access to some required information such as demographic information when making related decisions. However, they do not have timely access to the most of the elderly health-related information affecting decision making by managers. An overview of the current status of the health information management system, the elderly health sector in Iran, is provided in Figure 2.

5. Discussion

In Iran, all documentations related to elderly people in primary health care centers and some of documentations in hospitals and clinics are prepared manually. Also, the data flow, the analysis and reporting data as well as the access to the information in primary health care centers are not automated. As a result, elderly health managers are not timely provided with needed information. It is, therefore, suggested that the Ministry of Health develops infrastructures for electronically data documentation and provision of such data for administrative managers. Finally, in addition to the development of infrastructures, the researchers suggested the ministry of health to put a high priority on the establishment and implementation of the health information management system for elderly health sector in Iran; so that managers who make decisions regarding elderly health can have timely access to the required information.

Acknowledgments

This study was part of a PhD thesis supported by Iran university of medical sciences (grant No.IUMS/SHMIS-1391/338).

Footnotes

Authors' Contribution: Farahnaz Sadoughi: Design of the study, literature review, analysis and interpretation of data and abstract data; Mehraban Shahi: literature review, statistical analysis, gathering the questionnaire; Maryam Ahmadi: conduct the meeting, writing the paper, revising the manuscript; Nasrin Davaridolatabadi: conducting the research, writing the paper, literature review, revising the manuscript, statistical analysis, preparation the manuscript.

Financial Disclosure: All financial disclosure is owned by Iran university of medical sciences. All authors of this study declare that they have no financial disclosures.

Funding/Support: This study was supported in part by Iran university of medical sciences (grant No.IUMS/SHMIS-1391/338).

References

1. Chaulagai CN. Design and implementation of a health management information system in Malawi: issues, innovations and results. *Health Policy Plan.* 2005;**20**(6):375-84. doi: 10.1093/heapol/czi044. [PubMed: 16143590]
2. Heeks R. Health information systems: failure, success and improvisation. *Int J Med Inform.* 2006;**75**(2):125-37. doi: 10.1016/j.ij-medinf.2005.07.024. [PubMed: 16112893]
3. Tsai CH, Chen CW. An earthquake disaster management mechanism based on risk assessment information for the tourism industry-a case study from the island of Taiwan. *Tourism Manag.*

- 2010;**31**(4):470-81. doi: 10.1016/j.tourman.2009.05.008.
4. Moisil I, Jitaru E. E-health progresses in Romania. *Int J Med Inform.* 2006;**75**(3-4):315-21. doi: 10.1016/j.ijmedinf.2005.08.013. [PubMed: 16275159]
5. Madon S, Sahay S, Sudan R. E-Government Policy and Health Information Systems Implementation in Andhra Pradesh, India: Need for Articulation of Linkages Between the Macro and the Micro. *Inform Soc.* 2007;**23**(5):327-44. doi: 10.1080/01972240701572764.
6. Tripathi K. MIS is an Effective Tool to Decision Making. *Int J Comput Applicat IJCA.* 2010;**7**:25-8.
7. Al-Zhrani S. Management information systems role in decision-making during crises: case study. *J Comput Sci.* 2010;**6**(11):1247.
8. Wade LC. Review. *Pac Historic Rev.* 2004;**73**(2):328-30. doi: 10.2307/3641622.
9. Ajayi IA, Omirin FF. The use of management information systems (MIS) in decision making in the South-West Nigerian Universities. *Educ Res Rev.* 2007;**2**(5):109-16.
10. Adeoti Adekeye WB. The importance of management information systems. *Lib Rev.* 1997;**46**(5):318-27. doi: 10.1108/00242539710178452.
11. Powell T, Dent-Micallef A. Information technology as competitive advantage: The role of human, business, and technology resources. *Strategic Manag J.* 1997;**18**(5):375-405.
12. Robey D. User Attitudes and Management Information System Use. *Acad Manag J.* 1979;**22**(3):527-38. doi: 10.2307/255742.
13. Chatterjee S, Rothenberger MA, Tuunanen T, Peffer K. A Design Science Research Methodology for Information Systems Research. *J Manag Inform Sys.* 2007;**24**(3):45-77. doi: 10.2753/mis0742-1222240302.
14. Gupta P, Bagga RK. *Compendium of E-governance Initiatives in India.* India: Universities Press; 2008.
15. Dargahi H. Evaluation of the Clinical Information System in Public Hospitals. *Pyavard Salamat.* 2008;**4**(1-2):31-4.
16. Andersson A, Hallberg N, Eriksson H, Timpka T. A management information system model for process-oriented health care. *Stud Health Technol Inform.* 2004;**107**(Pt 2):1008-12. [PubMed: 15360964]
17. Henriksen E, Selander G, Rosenqvist U. Can we bridge the gap between goals and practice through a common vision? A study of politicians and managers' understanding of the provisions of elderly care services. *Health Policy.* 2003;**65**(2):129-37. [PubMed: 12849912]
18. Coovadia H, Jewkes R, Barron P, Sanders D, McIntyre D. The health and health system of South Africa: historical roots of current public health challenges. *Lancet.* 2009;**374**(9692):817-34. doi: 10.1016/S0140-6736(09)60951-X. [PubMed: 19709728]
19. United Nations. Dept. of Economic and Social Affairs. Population Division. *World population ageing, 1950-2050.* New York: United Nations; 2002.
20. Statistical Centre of Iran. *Detailed Results of Census Population and Housing. Tehran: Statistical Center of Iran [In Persian].* 2012. Available from: <http://www.amar.org.ir/Default.aspx?tabid=1828>.
21. Statistical Center of Iran. *Statistical Center of Iran: part of population.* Tehran: 2013.
22. Tomasi E, Facchini LA, Maia MF. Health information technology in primary health care in developing countries: a literature review. *Bull World Health Organ.* 2004;**82**(11):867-74. doi: 10.1590/S0042-96862004001100012. [PubMed: 15640923]
23. Chen Y, Persson A. Internet Use among Young and Older Adults: Relation to Psychological Well-Being. *Educ Gerontol.* 2002;**28**(9):731-44. doi: 10.1080/03601270290099921.
24. Berisha-Shaqiri A. Management Information System and Decision-Making. *Acad J Interdisciplin Stud.* 2014;**3**(2):19.
25. Sofaer S. Qualitative research methods. *Int J Qual Health Care.* 2002;**14**(4):329-36. [PubMed: 12201192]