

Research Article

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An evaluation of role of the informational components in decision-making process of health systems' managers based on World Health Organization's standards

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ABSTRACT

Background: Objective of current study was to enhance the effectiveness of the organization its goals, health system managers must possess sufficient knowledge about health information systems which are regarded as the basis of decision-making at different managerial levels. The present research tried to explore the extent of meeting the information management components and evaluate its role in decision-making of health systems' managers.

Methods: Descriptive-analytical in nature, this study intended to examine the urban and rural health centers as well as health system. Data were collected through a self-designed checklist produced based on the World Health Organization's standards which include the information presentation (6 components), information interpretation (5 components) and using information in decision-making process (1 component) for urban and rural health centers. The checklist designed for health system included needs-analysis and information collection, presentation, processing and interpretation components. The gathered data were then put into SPSS version of 13 and analyzed using independent t-test.

Results: The findings of the study revealed that compared to urban centers, the rural health centers had a higher level in meeting the components in 3 main areas i.e. information presentation, information interpretation and information use in decision-making process ($P < 0.05$). As far as sub-measures were concerned, the rural health centers gained a higher mean score for data presentation in the health system and other interpretation-related components ($P < 0.05$). The level of meeting data presentation components revealed that the mean score for using data for decision-making purposes was high while the mean score for data processing was found to be low.

Conclusion: Proper processing and appropriate use of data in the decision-making by the managers and public policy-makers are the missing requirements which must be taken into account.

Keywords: Data presentation, Data interpretation, Decision-making by the managers, Health system

INTRODUCTION

Due to the wide scope of functions description as well as the wide range of service-providing units in the urban and rural areas of Iran, the significance of health information system is increasingly felt.¹ Creating an efficient information system to support decision-making by the health personnel is regarded as one essential component of health services.² Affecting the decisions on investments, efficiency, effectiveness and quality of health system, data can promote health. Nevertheless, in many nations, a number of factors such as weak coordination in the performances of information system, inefficient and improper use of data and lack of sufficient data due to the weaknesses of health-care providing facilities especially in the rural areas limit the to what extent health information system affect the health services management.³ To facilitate the orientation of health centers, the typical structure and procedure adopted for data collecting, data analyzing, data reporting and data application must be modified.⁴ Based on the main principles of health information system, such systems must support the initial health care approach collecting the data required for calculating the indices and integrate health personnel and health services providers at all levels by providing them some incentives.⁵ Data analysis must make the health care authorities aware of how the personnel who are working in individual health system areas contribute to improve the service-providing quality purposefully and collect their viewpoints regarding problem solving on a daily or weekly basis.⁶ Besides the performance indices, data sets required for an urban or rural health care center must include informational indices for evaluating the status quo of ministries, regions or towns as well. According to WHO's recommendation, the development of data collection system must be carried out at 3 levels including the creation of data collection tools, forms designing and their preliminary tests and finally, implementing the new data collection instruments.⁷ Immediately after data collection, data matching and indices calculation, the resultant data must be interpreted. Interpretation signifies exploration in the senses and meanings of data.⁸ Many argue that data can be effective for decision-makers when they are relevant, reliable and timely. Given the position of information system in any organization and its critical role in adopting proper and correct policies, developing a coordinated and integrated information system and enabling the experts in using the data properly are among the critical priorities.⁹ Hence, considering the necessity of collection and documentation of the unrepeated required data in the health system so as to promote services quality and use the resultant data in decision-making and their proper presentation and interpretation, it is necessary to assess the health system and its existing in-use informational components consecutively based on global reliable indices. Accordingly, the present study aimed to evaluate the level of satisfying informational management

components and their role in making decisions by the health system managers referring to WHO's standards.

METHODS

The research setting of this study which is of descriptive-analytical nature includes the health systems of Char Mahal va Bakhtiari Province, Iran with its rural and urban health centers being as the units in question. Due to the broadness of research population, one of the towns of this province (i.e. Borujen) was randomly selected and all of its rural and urban centers were considered. Totally, there were 25862 and 820 urban and rural families in the selected town. In addition, there were 9 urban health centers, 5 rural health centers and 1 town's health system i.e. Borujen. The data collection tool was a self-designed checklist developed based on the standards of WHO the validity of which was tested using the guidance of professors of health information management domains. This checklist covered 12 areas 7 of which were related to data presentation including mothers' health diagrams (5 items), immunization (4 items), medical care (2 items), data presentation in the health system (15 items), monthly written feedbacks (6 items) and software reports (12 items), cell diagrams (7 items), 4 areas were related to data interpretation (namely, evaluation (3 items), general indices (30 items), laboratory indices (3 items) and other data interpretation-related criteria (6 items) and finally, one area related to using data for decision-making purposes including 13 items. In sum, 106 items were included in the checklist. In the checklist designed for evaluating the level of meeting the information management components in the health system, there were 21 items on needs-analysis, 15 items on data collection (including 4 items for preventable disease, 3 items for organizational unit-related data, 8 items for infrastructural data, 23 items for data presentation, 3 items for data processing and finally, 23 items for data applications for decision-making purposes. The data required for completing the checklists were extracted from families' health profiles and documents available in the Borujen's health system. The gathered data were put into SPSS to be analyzed. Based on the collected data, the frequency and mean scores were calculated. To find the association among various parameters, independent t-test was used being considered significant at $P < 0.05$.

RESULTS

14 centers including 9 urban and 5 rural centers were examined. As the results indicate, there was statistically significant difference between urban and rural areas regarding the level of meeting the information management components in their health information systems for data presentation and data application in decision-making process ($P < 0.05$) with rural centers enjoying a higher mean score than urban centers. However, the difference between urban and rural areas was not statistically significant for data interpretation (Table 1).

Table 1: A comparison of the level of meeting information management components in the urban and rural health centers.

Components	Urban health SD* ± mean	Rural health SD ± mean	Significance level for independent T-test
Data presentation	51.55 ± 17.22	80.67 ± 7.97	P <0.001
Data interpretation	72.43 ± 11.62	79.35 ± 6.02	P = 0.24
Data use in decision-making	52.99 ± 27.33	90.0 ± 9.19	P <0.05

*SD: Standard Deviation

Table 2: A comparison of the level of meeting sub-components of data presentation and interpretation in the urban and rural centers.

Components	Centers	Urban health	Rural health	Level of significance of independent t-test
		SD ± mean	SD ± mean	
Data presentation	Mothers' health diagrams	85.00 ± 22.63	85.00 ± 15.41	P = 1
	Immunization	79.16 ± 17.39	81.25 ± 18.75	P = 0.84
	Medical care	18.05 ± 32.54	97.50 ± 5.59	P <0.001
	Data presentation in the health system	39.07 ± 25.15	74.0 ± 9.38	P <0.05
	Monthly written feedbacks	44.90 ± 28.16	70.0 ± 18.68	P = 0.07
	Software reports	42.28 ± 50.26	75.60 ± 10.86	P = 0.17
Data interpretation	Cell diagrams	52.38 ± 20.36	81.40 ± 16.24	P <0.05
	Evaluation	82.40 ± 23.36	80.0 ± 16.28	P = 0.82
	General indices	82.77 ± 11.90	67.20 ± 17.27	P = 0.12
	Laboratory indices	75.92 ± 15.83	83.35 ± 16.62	P = 0.43
	Other criteria of data interpretation	48.61 ± 26.10	86.85 ± 10.12	P <0.05

*SD: Standard Deviation

Table 3: The level of meeting the components of information management in the health system.

Components	Mean
Needs-analysis	65.47
Data collection	Preventable disease
	Organizational units
	Infra-structural Data
	General
Presentation	44.56
Processing	25
Use in decision-making	92

DISCUSSION

According to the results of evaluating the health information system following the standards stipulated by

As for results gained for the level of observing criteria related to data presentation, the rural health centers were found to have significantly higher mean scores for data presentation in the health system, medical care as well as cell diagrams items (Table 2). As far as data interpretation is concerned, the mean score gained for rural centers were significantly higher than urban centers. In addition, the urban and rural centers obtained higher mean scores for 2 areas of general indices evaluation and laboratory indices, respectively, although such differences were not statistically significant (Table 2).

The results gained for the level of meeting the criteria or standards of data presentation in the Health system revealed that the mean scores are higher for the use of data in decision-making. Then, it is followed by the data collection criteria with the lowest mean score belonging to the data processing being much lower than the medium level (Table 3).

the World Health Organization, the health system's managers have trivial managerial and informational skills; hence, the health system must make efforts for promoting their skills. In one study on the Town's health information systems in 14 African nations, Humber Tamoking enumerates the lack of necessary skills as one of the reasons for paying attention to town's information system.¹⁰ Another study on the localization of health information system reported that functions fulfillment is summed up into servicing the visitors, data input and their reporting to the region.¹¹ Most health care providers in the developing countries regard the informational systems the same as registration forms which include the name and address of the patients and cover some information on diseases (like age and gender). Such forms are completed and sent weekly or monthly without sufficient feedback. In addition, since the data gathered by such forms are incomplete, improper, untimely,

useless and irrelevant to the function and performance descriptions concerns of local health personnel, they are not by and large beneficial for facilitating decision-making. To put it differently, instead of being performance-based, the informational systems in use in such nations are data-based rather than performance-based.¹² The following items are among the underlying criteria and standards in the health system which have rarely been addressed: paying due attention to the informational infra-structures like the formation of informational teams composed of informational staffs and managers, the training-oriented infrastructures in the form of in-service training and training workshops focused on resolving the existing difficulties in the information systems and information management trainings especially in areas of decision support, procuring hardware and software infrastructures producing dynamic reports in the urban and rural centers, creating software reports for original and prioritized health care plans like Tuberculosis, initial health care, public care, human resources, budgeting, health training, nutrition, drugs and medical equipments, contagious diseases, children, women and mothers health, AIDS, sexually transmittable disease, identifying the essential informational requirements for managing the visitors of the health centers, collecting the data regarding the preventable disease, medical and family history of the visitors, producing some dictionaries for data definitions and their distributing in the centers, controlling the data for their accuracy, sufficiency, stability and timely accessibility to them at all levels, modifying the horizontal and vertical transfer processes of the data in the town's health information system, self-assessments in the health centers using the data. The indicators used for human, transportation, financial and laboratory resources procurement and control belong to the general class of indicators of health systems.¹³

The selected indicators related to town, children and mothers' health data, contagious disease, managerial consequences, the results of the comparison of the level of the coverage of town service canters, health centres' load work capacity and computerized diagrams of the health centres, information producers and users are reported to higher level health centres monthly by the town's health information unit. These centres cooperate on how to use the data for the decision-making process and how to promote the data quality in team. The data forms the main focus of meetings held by the health centres. All observatory inspections focus on analyzing, processing and interpreting the data.³ Generally, data collection starts at the community or the health centre level. They, then, are sent to the province centre and finally the national organization where the international requirements are evaluated.¹⁴ The six-stage procedure adopted for developing an information system in a health care system is as follows: a) creating an informational groups to ensure all personnel are aware from the significance of the data and collect them properly, b) collecting the data from all personnel to produce monthly

reports for the health centre, c) putting the gathered data into the computer and producing feedback reports, d) sending the feedback report to the centre and exchanging ideas and viewpoints about it with the cooperation of all group members, e) ensuring that all the required diagrams have been produced and represented to all the members of the group.¹⁵ At the second stage which relates to data analysis, the first task of the data analysis group is to understand what data have been collected and why? To do so, all personnel must take the following items into account: Who has collected the data and for whom? What data have been collected? In what format? Are they useful at the local level? When have the data been gathered? What is the time limit for producing the reports and taking actions based on the reports? From where are the data sent? Are they aggregated in the centre and analyzed in the town's centre before being sent to the higher levels? What is the main reason of data collection? Whether are they put in the access of those who collect them or sent for the managers of higher levels? How is the data collection carried out? How are they combined and transformed into the efficient and usable data?¹⁶ The typical procedure and structure used for data collecting, processing and analyzing, reporting and application must be modified so that it can shape the orientation of the health center.¹⁵

Data analysis results must provide the town's health management team with some information about how the personnel functioning in different health centres of the town cooperate purposefully so as to promote service provision exchanging their viewpoints to solve the existing problems on a daily or weekly basis.¹⁷ The results of one research on the health information systems showed that there were not enough computers in the health centres to input and register the data with the existing computers being very worn-out.¹⁸ In another study found that given the position of information system in every organization and its critical role in adopting proper policies, creating a coordinated and integrated information system and enabling the experts in proper use of the data are deemed as the essential concerns.¹⁹ Another study concluded that the managers of medical centres enjoy an intermediate level of knowledge about the uses of information system. Taking this point into account, it is necessary to hold scientific training workshops to promote their level of knowledge and awareness.²⁰ One study on the evaluation of information registration status in the health centres revealed that the pregnancy-period care forms, family regulation forms, under 6-aged children care forms were wrongly filled in 60%, 42% and 36% of the cases, respectively.²¹ Accordingly, enhancing and improving the health information system have been regarded as the starting point in moving towards promoting the managerial capabilities of health system. Evaluation of the health information systems has illuminated several misconception most of which are related to the lack of integrity among various data resources. Besides, different

instruments may produce different data about one individual or one event.²²

Focusing on the informational infrastructures composed of informational staff and managers, identifying the main informational requirements for managing the visitors of the health centres at all levels are among the prerequisites for promoting the health system quality.

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REFERENCES

1. Lippeveld T, Sauerborn R, Bodart C. Design and implementation of health information systems. In: Lippeveld T, Sauerborn R, Bodart C, eds. WHO Information. Geneva: Wold Health organization; 2000: 1-2.
2. Hanmer Lyn. Criteria for the evaluation of district health information systems. *Int Med Inform.* 2000;56:161-8.
3. Omar MA, Charimari LS, Pinto A. The district health information system and its potential in the management of district and rural hospitals. *United Kingdom J World Hosp.* 2001;30(3):15-20.
4. Heywood A, Rohde J. Using information for action: a manual for health workers at facility level. In: Heywood A, Rohde J, eds. Health Information Systems Program. Bellville, South Africa: University of the Western Cape; 2002: 1-123.
5. Klauche DN. Guidelines for evaluating surveillance systems. *Morb Mort Weekly Rep.* 1988;37:1-18.
6. World Health Organization. Report of the interregional meeting on strengthening district health systems based on primary health care, Harare, Zimbabwe. In: WHO, eds. WHO Report. Geneva: World Health Organization; 2000: 1-42.
7. Picheral HE. Place, space and health. *Soc Sci Med.* 2004;39:1589-90.
8. World Health Organization. Rapid evaluation method guidelines for maternal and child health, family planning and other health services. In: WHO, eds. WHO Guideline. Geneva: World Health Organization; 2000: 1-30.
9. Govind Salik. National health management information system in Mongolia: issues, challenges and opportunities. In: Govind Salik, eds. Bi-Regional Consultation on Strengthening Health Information System in Asia and Pacific. Bangkok: Bangkok Press; 2004: 13-16.
10. Muquingue, Humberto. Overview of the HISD district health information systems, 2007. Available at: www.houstonisd.org/.
11. Twaakyondo HM. DHIS Customization Tanzanian experience, 2003. Available at: <http://www.hispkerala.org/conference/presentations/country%20presentation>.
12. Shaw Vincent. health information system reform in south Africa: developing an essential data set. *Bull WHO.* 2005;83:632-9.
13. World Health Organization. The challenge of implementation: district health systems for primary care. In: Janovsky, Katja, eds. WHO Review. Geneva: World Health Organization. 1998: 1-71.
14. Barron P, Hanmer L, Mahomed H, Braa J. District health information system guidelines, 2001. Available at: <ftp://ftp.hst.org.za/pubs/other/dhis/dhis.pdf>.
15. Tugwell P. The measurement interactive loop: a framework for the critical appraisal of need, benefits, and costs of health interventions. *J Chron Dis.* 2005;38:339-51.
16. Stinson W. Information systems in primary health care. In: Stinson W, eds. International Health Programs. Washington DC: American Public Health Association; 1983: 1-76.
17. Odhiambo GW. Evaluation criteria for district health management information systems: *Int J Med Inform.* 2005;74(1):31-8.
18. Smith DL, Hansen H, Karim MS. Management information support for district health system based on primary health care. In: Smith DL, Hansen H, Karim MS, eds. Health System. 3rd ed. Geneva: Agakhan foundation; 2004: 89-110.
19. Dunn WN. The two communities' metaphor and models of knowledge use: an exploratory case survey. *J Knowl.* 2005;1:515-36.
20. Richard E. Cibulskis. Information is not only for manager. *Bull WHO.* 2005;83(8):637-8.
21. Ho TJ. Managing health and family planning delivery through a management information system. In: Ho TJ, eds. Health System. Washington DC: World Bank; 1985.
22. Frère JJ. Health and management information system for child survival project in Pakistan. In: Frère JJ, eds. Technologies for Primary Health Care Project. 2nd ed. Washington DC: United States Agency for Informational Development; 2007: 1-23.

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