REVIEW ARTICLE

The advantages and barriers in the implementation of a substance dependence treatment information system (SDTIS)

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Addiction is a phenomenon that causes structural changes in different systems of society. Studies show for planning of addiction prevention and treatment, it is necessary to create an information management system. Substance dependence information systems refer to systems which collect, analyse and report data related to substance dependence information. The aim of this study was to identify advantages and barriers to implement Substance Dependence Treatment Information System (SDTIS). This study was a narrative review. Our review divided into three phases: literature collection, assessing, and selection. We employed the following keywords and their combinations in different areas of articles. In this study, 22 of collected articles and reports were selected based on their relevancy. We found many advantages for a substance dependence treatment information system such as recording sufficient, complete and accurate information and easy and timely access to them and monitoring and enhancing the quality of care received by patients. But we may face some concerns for implementing this information system like taking time and funds from client services, being expensive or even problems regarding the quality of data contained in these information systems. There are some important problems in the way of implementing. In order to overcome these issues, we need to raise community awareness.

Key words: Health care, information system, management information system, registry, substance dependence

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INTRODUCTION

Addiction is a phenomenon that causes structural changes in different systems of society. The World Health Organization (WHO) has counted narcotic drugs challenge next to three other global issues, namely, plural murder weapon, environmental pollution, and poverty and categories gap, as a basic problem that has threatened human life in the world.[1] The first step in the way of battling with, preventing, and controlling a social phenomenon is complete and correct recognition of the phenomenon so that proper planning is possible.[2] In the addiction field, prevention means applying procedures, which lead to reduction of the number of addicts. Prevention includes procedures for reduction of risk factors and increase of factors, which keep people from using substances. Thus, complete recognition of these factors in every region will be possible with the help of accurate, complete, correct, and update information. In addiction treatment, without the access to identification and causal information, distribution of personal trusteeships and treatment equipment will not be possible.[3-7] In another word, reliable and secure health care depends on accurate, reliable, timely, and complete information. So it is essential to manage the information in the most effective possible way in order to be sure of high quality and security services.[8]

The aim of the information system is informing others; thus, the information system gives proper information to users based on their information need. The information system is a set of organized components, which

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are responsible for collecting, storing, and distributing information. Because of the great influence of narcotic drugs on society, it is essential to codify necessary policies for creating a substance abuse information system. It is notable that designing of a substance abuse information system with the aim of converting data into information and knowledge has a great role in supporting the prevention and control of addiction.[2] Studies show that for the planning of addiction prevention and treatment, access to information and wide partnership and group working of related organizations is a really essential issue and it is necessary to create an information management system.[3] Substance abuse information systems refer to systems which collect, analyze, and report data related to substance abuse information from centers, which users usually refer to.[2]

The researcher believes that substance dependence treatment information system (SDTIS) is a set of related components of substance dependence, which collect, process, store, and report information on treatment. Apart from this, there is no limitation for the kind of substances in this research. The aim of this study was to identify the advantages and the barriers in the implementation of SDTIS.

MATERIALS AND METHODS

This study was a narrative review. Our review divided into three phases: literature collection, assessing, and selection. Researchers identified studies which denoted on the role of information systems in quality of healthcare services. The literature was searched with the help of databases, and also searches engines available at Google, Google scholar, books and conference proceedings with keywords including their combinations in different areas of articles. Dependence, Addiction, Information Systems, Registry, Management Information System, Substance abuse, Heroin, Drug, Advantage, and Barrier the Registry, Management Information System, Information System, Substance Dependence, Healthcare, barrier, advantage and in the searching areas of titles, keywords, abstracts, and full texts. The search was performed in December 2013. Only articles written in English and Persian languages were considered. More than 70 articles, proceedings, and thesis reports were collected and assessed and 22 of them were selected based on their relevancy.

RESULTS

The advantages to implement substance dependence treatment information system

Dennis and Scott in their study titled "Managing addiction as a chronic condition" reviewed the progress in adapting addiction treatment to respond more fully to the chronic nature of most patients' problems. The researchers said that when we get familiar with the factors, which affect the treatment progress, we need to organize related information in order to support clinical decision-making. Also, about transferring patients, we have to make essential changes in the related systems for transferring information and make them accessible to the medical staff.[9] So we can say that the first reason for making an information system in every field of the health care system is to have related and organized information.

Barbui *et al*. in their article entitled "Development of a registry for monitoring psychotropic drug prescriptions: Aims, methods and implications for ordinary practice and research" presented the methodology employed to develop a psychotropic drug registry. They developed a registry including every patient receiving psychotropic medications in ordinary practice. This system produces information on discontinued treatment, side effects, recovery or inefficacy, and improved persons. It is notable that development, organization, and use of this registry were made by physicians interested in monitoring clinical practice and in providing patients, relatives, and the public with accurate information on drug use in their specific context of care. Finally, they concluded that the presence of monitoring systems, which are able to link drug and service-user data with outcome indicators is a basic quality requirement for modem psychiatric services and the presence of interest in monitoring ordinary practice is necessary.[10] One of important abilities of an information system, which is mentioned in this research, is being linked with other information systems.

Evans *et al*. in their article titled "A survey of Australian clinical registries: Can quality of care be measured?" said that clinical quality registries gather and analyze information to monitor and enhance the quality of care received by patients. They distributed a survey to registry custodians managing multisite clinical outcome registries. They were asked to self-report on general aspects of registries including coverage, length of operation, data collection process, data management, quality of data, and registry governance structures. As a result, they found some benefits about registries, especially clinical registries. For example, providing credible information on the quality of care and being useful in measuring improvements. According to the researchers' idea, they should fund for the necessary changes so that clinicians, administrators, and policymakers are able to utilize the value of this registry.[11] It is important to pay attention to the funding issue since it can be a problem for the implemention of an information system. It is explained in more detail in the next part of the article.

Aziz *et al*. conducted a study titled in which they described the National Mental Health Registry (NMHR) in Malaysia and its reports. They explained that NMHR allows patients with mental disorder to estimate the incidence of selected mental disorders, and to evaluate risk factors and treatment. Actually, their aim of developing NMHR was to ensure the accuracy, availability, accessibility, and timeliness of mental health information so that with this information, a strategy can be implemented to improve mental health services and reduce the burden of mental health disorders in this country. At last, they concluded that the NMHR had provided vital information in the development of mental health services and the data from this registry had been used as a platform for further research on mental health disorders in Malaysia.[12] When we speak about health data, we claim that they need to be accurate, complete, timely, and accessible. So it has to be considered in every information system too.

Rotondi and Rush in their study titled "Monitoring utilization of a large scale addiction treatment system: The Drug and Alcohol Treatment Information System (DATIS)" introduced this system, which is an evolving system and an integral component of Ontario's performance measurement system. Actually, DATIS is a client-based information system that collects data from Ontario's publicly funded addiction treatment agencies and monitors the number and types of clients treated in Ontario's publicly funded addiction treatment services. As researchers expressed in this article, comprehensive client-based information systems are useful for producing data on system accountability, providing information for planning and ongoing system enhancement, contributing invaluable information related to the changing patterns of drug use in the general population, and being used for research purposes. DATIS has linked to many of the larger health care information systems in Ontario, which allow it longitudinal tracking of client health-related outcomes. As a result, DATIS as a data source for supporting system level performance measurement and clinical research has a unique scope and quality within Canada.[13]

Tai and McLellan in their study titled "Integrating information on substance use disorders into Electronic Health Record Systems (EHRS)" said that medically harmful use is difficult to identify without standardized information collection and including substance use information within EHRS could enable physicians and pharmacies to work more collaboratively to reduce the frequency of drug–drug interactions and overdose incidents. They explained that in 2006, many institutes of the National Institutes of Health (NIH) began developing sets of standardized common data elements (CDEs) to be used in clinical practice. As the researchers said, the specific goals of this initiative are:

a. To develop standardized, expert-defined CDEs of substance use for incorporation into EHRS;
b. To ensure that data standards incorporate certified technology, which allows interoperability with other systems;
c. To meet current and future meaningful use criteria; and
d. To collaborate with partner NIH institutes and other federal agencies to realize these goals.[14] In the addiction field, EHRs and information systems are closely related to each other and they can show the frequency of substance dependence problem in a way such that we can plan to reduce it.

Coffey *et al*. in their article titled "Transforming mental health and substance abuse data systems in the United States" focused on the need for interoperable information systems. They said that data interoperability was the ability of dispersed, separately owned, and separately managed information systems to communicate with one another electronically to share specific bytes of data. The researchers claimed that data systems that link information from different programs and care settings could facilitate coordination and support evaluations of programs. They believed that data systems help researchers and clinicians understand clinical interventions on a large scale and present a more practical, affordable, and manageable approach to client-centered information exchange in the immediate future.[15]

Soldz and Panas in a study titled "The reliability of the Massachusetts Substance Abuse Management Information System (SAMIS)" wrote about the greater demand for accountability of the health care field, and more pressure on treatment providers to make centralized administrative databases that collect basic information on client characteristics, treatment service provider, and outcome data. These databases have useful information for management, policy formation, and research.[16]

Mokri *et al*. in their study titled "An introduction to INCAS (Iranian National Center for Addiction Studies) substance abuse profile" said that the creation of this record is the first step for accurate assessment and utilization of treatment center performance in order to analyze treatment process and output. Also, it helps create a network among treatment centers and administrative and policy-making centers. At last, they said that we could make a reportable and analyzable database based on this record.[17]

Lotfnezhadafshar *et al*. in an article titled "Comparative study of the mental health registry system of the United Kingdom, Malaysia and Iran" claimed that lack of a national registry of mental health has posed serious problems in the control and prevention of mental health, performing

epidemiological searches, designing policies and strategies for controlling of mental disorders expenses, and improving the quality of treatment. Thus, they recommended some procedures in order to improve the recording of problems related to mental health and mental diseases such as the creation of Minimum Data Set (MDS) for mental health, use of registry for advanced mental health services presentation at the country level, creation and dissemination of standard instructions regarding data collection, and providing information technical infrastructures in order to create electronic records.[18]

Ebadyfardazar *et al*. in their study titled "A comparative survey of mortality information management systems (MIMS) in England, United States of America and New Zealand and proposing a suitable MIMS model for Iran" expressed the aim of mortality information management to record sufficient, complete, and accurate information and easy and timely access to them. They said that using results and reports of this information system can affect on promoting and developing of the health system in U.S., England, and New Zealand. Furthermore, these results are processed and analyzed in a way such that special reports, which can influence in the case of outbreak of diseases and incidence of deaths, are sent to other parts (outside of health field) and related organizations use this information for prevention planning.[19]

Ajami *et al*. in their article titled "A survey of experts' opinions about the role of heroin addiction information management systems on its prevention and treatment in Esfahan" introduced Heroin Addiction Information Management System (HAMIS) as a system, which records, collects, stores, retrieves, analyzes, and distributes causal and identifiable information of heroin addicts and uses the information for prevention and treatment. They concluded that most of experts believe that the presence of a centralized information bank for heroin addicts is essential for prevention and treatment planning.[3]

The barriers to implementing substance dependence treatment information system

Wisdom *et al*. in their study titled "Addiction treatment agencies' use of data: A qualitative assessment" said that efforts to implement addiction information systems have some problems regarding data management, data collection, and the use of data for process improvement. One of these challenges is that an addiction management information system is time-consuming. Other problems included: Treatment providers are worried about failed data collection efforts and misinterpretation of data, confidentiality concerns, lack of centralized information services, lack of uniformity of definitions, lack of a data-based decision-making culture, lack of expertise and other resources, treatment system complexity, and resistance.[20] Similar to other health information, the issue of confidentiality of information is critical, which is why people are worried about collecting information.

Warner-Smith in his study with the title of "The challenge of developing drug information systems in Africa" claimed that designers of drug information systems are faced with the problem of an absence of routinely collected indicator data and a shortage of skilled individuals to oversee drug information systems. Furthermore, development of drug information systems is only possible through the engagement of local people; and the institutionalization of data collection activities across all sectors and at all levels. It is notable that the utility of these systems assists in formulating policies and strategies to reduce the burden of drug use in these societies.[21] Also, Coffey *et al*. in their study found out that the systems were expensive and in their infancy and there were many challenges in implementing interoperability among existing systems such as different concepts and data elements, incompatible definitions for the same data elements, local coding schemes for concepts, varying record-keeping practices, and missing clinical elements.[15]

Soldz and Panas also mentioned that the use of centralized administrative databases requires extreme care and creates some unfamiliar issues for researchers and several concerns regarding the quality of data contained in these information systems. One of the most important concerns is that the data are not very reliable; the data are provided by clients who might be less than totally forthcoming about illegal substance abuse behaviors and who might also be intoxicated and thus, potentially cognitively impaired at the time of assessment. The data are collected by hundreds of different counselors. At last, they recommended developing

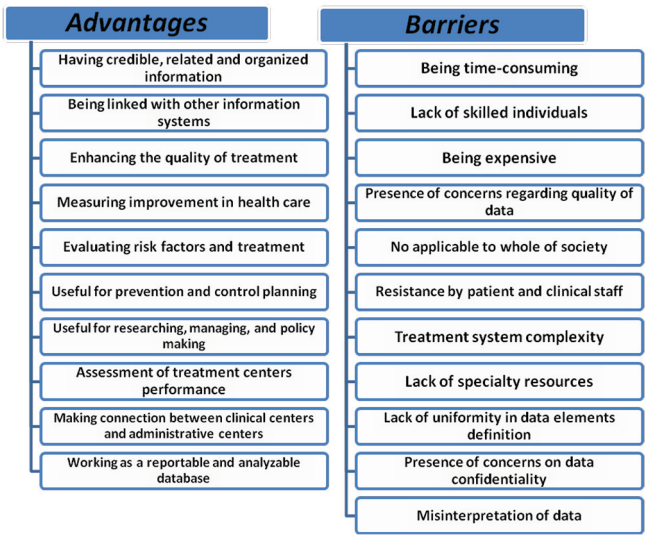

Figure 1: Advantages and barriers of SDTIS

formal protocols to examine data quality and consistency after admission and claimed that such reviews might decrease most of the errors and produce improved and more reliable data.[16]

Dargahi *et al*. in a review article titled "Ethical challenges in e information system, substance abuse" said that although substance abuse information systems were important for the prevention and control of addiction and addicts, they had some problems and challenges in designing and developing and they may posed unpleasant consequences for substance abusers such that they would not show any desire for receiving treatment and council services or conducting epidemiological studies and these problems were in conflict with medical ethics considerations. At last, they concluded that the resulted information was not able to be generalized for the whole of society and therefore, correct control and prevention of drug abuse was not possible.[2] Because addiction is a disease, which has different aspects such as social, physical, and mental, it is essential to make a suitable culture and prepare people for implementing a SDTIS. This is what Dargahi meant by desire for receiving treatment and council services.

In this article, the review of related studies, advantages, and barriers is shown in Figure 1.

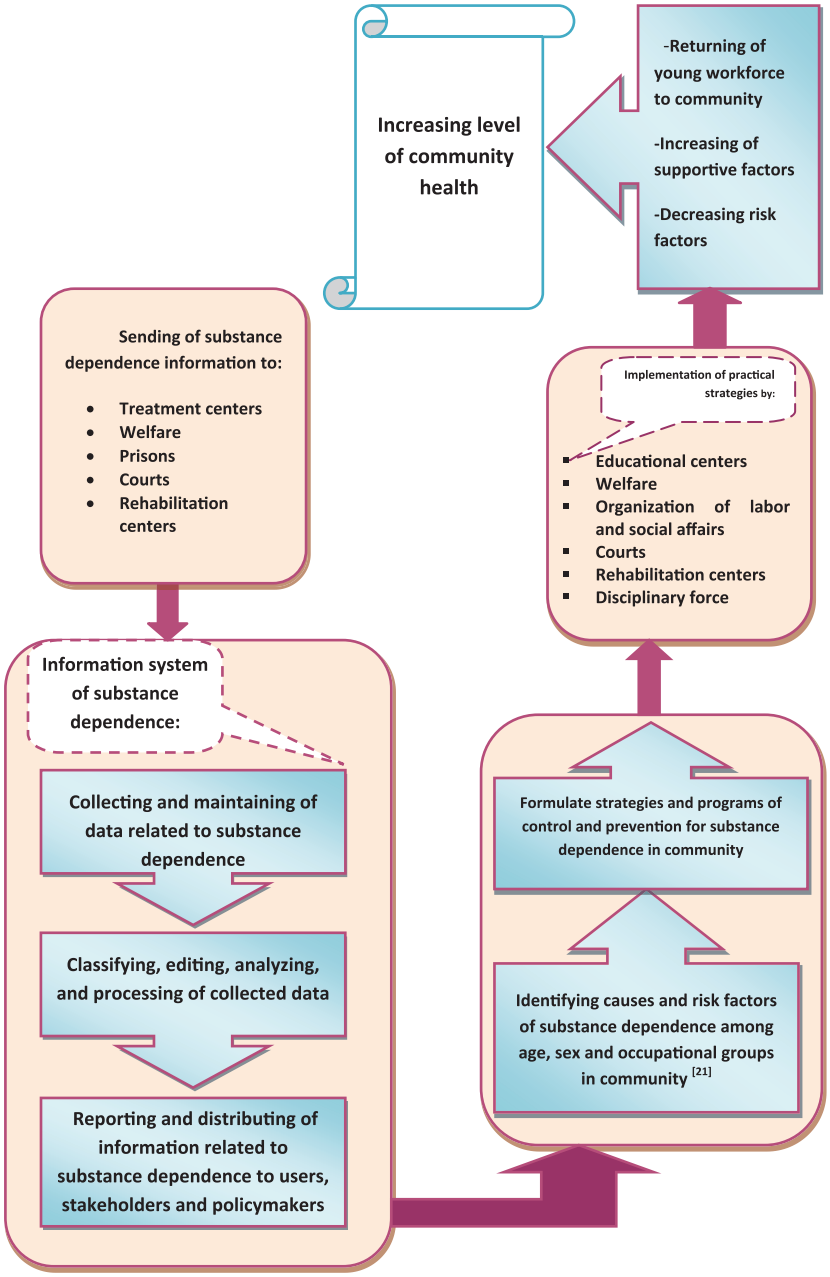

Figure 2: Conceptual map of position "substance dependence information system" in the process of upgrading community health

Based on reviewing of the articles, it can be said that the presence of a SDTIS in every country has a lot of benefits. The most important ones are recording sufficient, complete, and accurate information and easy and timely access to them; supporting clinical decision making; supporting audits of clinical practice; helping prevention, control, and treatment planning; monitoring and enhancing the quality of care; evaluating risk factors; being effectively used for research purposes; helping in the creation of a network among treatment centers and administrative centers, and allowing longitudinal tracking of client health-related outcomes by having linkages with other health care information systems. Also, it may be necessary to modify the assessment to transfer information when patients move between levels of care. In general, it is a useful and credible tool in measuring improvements in health care and one of vital prerequisites for creating and using an electronic health record (EHR) in every country.

Figure 2 shows position of SDTIS in the process of upgrading community health. According to this conceptual map, we find out the necessity of having such a system in every health care system. On the other hand, when we want to implement this kind of information system we face many challenges in approaching data management development and illustrate the culture related to the collection and use of data for process improvement. Other challenges include taking time and funds from client services, being expensive and in their infancy, the presence of different concepts and data elements and incompatible definitions for the same data elements; and shortage of skilled individuals or qualifications necessary to oversee drug information systems. These systems may make unpleasant consequences for substance abusers and these problems are against medical ethics considerations.

CONCLUSIONS

The resulted information is able not generalizing to the whole of society and therefore correct control and prevention of drug abuse is not possible. Moreover, these systems have posed serious problems in designing policies and strategies for the controlling of diseases' expenses and improving the quality of treatment and regarding the quality of data contained in these information systems. Developing formal protocols to examine data quality and consistency shortly after admission can help us to solve the last problem. However, advantages of substance dependence treatment information system can overweigh its disadvantages by funding in a way such that the necessary changes would be provided.

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Conflicts of interest
There are no conflicts of interest.

AUTHOR'S CONTRIBUTIONS

SA contributed in conducting the research project, preparing and editing manuscript, and approving the final version of the manuscript. ZM contributed in collecting the data, preparing and editing manuscript, and approving the final version of the manuscript.

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