Available online at www.sciencedirect.com

ScienceDirect

Procedia Computer Science 100 (2016) 826 – 831

Procedia Computer Science

Conference on ENTERprise Information Systems / International Conference on Project MANagement / Conference on Health and Social Care Information Systems and Technologies, CENTERIS / ProjMAN / HCist 2016, October 5-7, 2016

Proposal of an evaluation model for mental health care networks using information technologies for its management

André Luiz Teixeira Vinci[a,*], Rui Pedro Charters Lopes Rijo[b], João Mazzoncini de Azevedo Marques[a], Domingos Alves[a]

[a]*Ribeirão Preto Medical School, University of São Paulo, Ribeirão Preto, Brasil*
[b]*School of Technology and Management, Polytechnic Institute of Leiria, Leiria, Portugal*

Abstract

The Brazilian public health system instituted the mental health care networks in 2011. Thus, the goal of this paper is to describe the research methods used as basis for a proposal of an evaluation model of municipal and regional management of a Mental Health Care Network that comprises computerized information systems and specific indicators. Proposed steps include: Review of Brazilian legislation on management in mental health care networks; Formulation of questions about how is mental health care management in the region; Semi-structured interviews with stakeholders about the performance of the network ; Study of existing indicators in mental health field used in universal public health systems; Selection of indicators for implementation and availability in a web information system; Monitoring the system's access to obtain indicators' usage; Another set of semi-structured interviews to evaluate effective use of the provided indicators in management of mental health care. The results obtained will be evaluated qualitatively and quantitatively to compare the final overview with the initial one, regarding mental health care network management, and if the use of computerized indicators influenced it. The use of the proposed methods in specific localities will enable expansion of local knowledge improving management and health care quality.

Peer-review under responsibility of the organizing committee of CENTERIS 2016

Keywords: Mental Health; Health Care Networks; Health Management; Information Systems

* Corresponding author. Tel.: +55-16-3315-9043.
E-mail address: altvinci@usp.br

Peer-review under responsibility of the organizing committee of CENTERIS 2016
doi:10.1016/j.procs.2016.09.231

1. Introduction

Historically, in Brazil, health care regionalization has been one of the basic principles adopted since the creation of the national "Unified Health System" (in Portuguese: "Sistema Único de Saúde" – "SUS") and had its definitions and structure modified over time[1-6]. Health care networks are one of the ways to regionalize health care and currently the SUS is trying to implement them across the country[5,6]. However, this implementation is a challenge, because the Brazilian health system is highly decentralized and consists of healthcare services that can be financed and managed by both municipalities, as the states and even the federal government[6,7].

According to current legislation, the services of a region should be connected by a single mission, common goals and cooperative action, allowing the provision of continuous and comprehensive care to a given population. To achieve these goals, the legislation ensures the collaboration between different levels of government and healthcare providers through formal contractual arrangements and suggests the use of computerized information systems to assist in the planning and decision-making of the healthcare actions as well as to monitor and evaluate the referral established mechanisms through adequate indicators[5-10].

One of the regional networks considered fundamental within the SUS is the "Psychosocial Care Network" (in Portuguese: "Rede de Atenção Psicossocial" – "RAPS"), for people with distress or mental disorders, created by specific legislation in 2011[11,12]. The XIII Regional Health Department (in Portuguese: "XIII Departamento Regional de Saúde" – "DRS XIII") of the São Paulo state, which comprising 26 cities and a population of 1,327,989 inhabitants[13] and whose main city is Ribeirão Preto, instituted its RAPS in 2012.

This network incorporates local and regional community-based services, outpatient clinics, urgency and emergency services, psychiatric hospital wards and psychiatric wards in general hospital. It also has a web-based computerized information system that enables patients and services monitoring, the "Information System on Mental Health Care of DRS XIII" (in Portuguese: "Sistema de Informação em Saúde Mental do DRS XIII" – "SISAM 13")[14]. The development and implementation of SISAM 13 occurred by the Center for Information and Health Informatics of the Ribeirão Preto Medical School of the University of São Paulo, at the request of local and regional health authorities as a measure to improve the quality of provided care[14].

This particular RAPS has its monitoring made by representatives of mental healthcare services and government entities through committees of municipal, regional and state levels. However, there are no standardized arrangements or indicators for the evaluation and management of RAPS instituted by the government legislation. The only existing pacts refer to implementation, funding and operating standards for specific services of the RAPS.

Therefore, the goal of this paper is to describe the research methods used as basis for a proposal of an evaluation model of municipal and regional management of a Mental Health Care Network (RAPS) that comprises computerized information systems and specific indicators.

In the next section, we will present theoretical models used as reference background for the construction of the proposed model. Then, in the third section, we will describe the steps planned to build the model along with the possible methods used in its execution and analysis. At last, in the section four, we will present a brief description of the importance of such work and the possible scientific and health management ramifications that it may have.

2. Background

The use of some theoretical elements will be necessary for the development of the goals of this work. The following sections present such elements.

2.1. Mental health matrix of Thornicroft and Tansella[15] as a reference model for Psychosocial Care Network (RAPS)

The matrix for mental health of Thornicroft and Tansella[15] is the first element employed as a reference model for the RAPS. Its use is due to the need to develop logistics support system models for information integration as well as coordination of care of the networks. The matrix establishes a model that can be used to increase the clinical efficacy through evidence-based practice, based on two axes, one temporal and one spatial (geographic). The matrix also allows to assess both the forces or the areas for improvement in the services and it is useful for the entire operating line and the decision making process.[15,16]

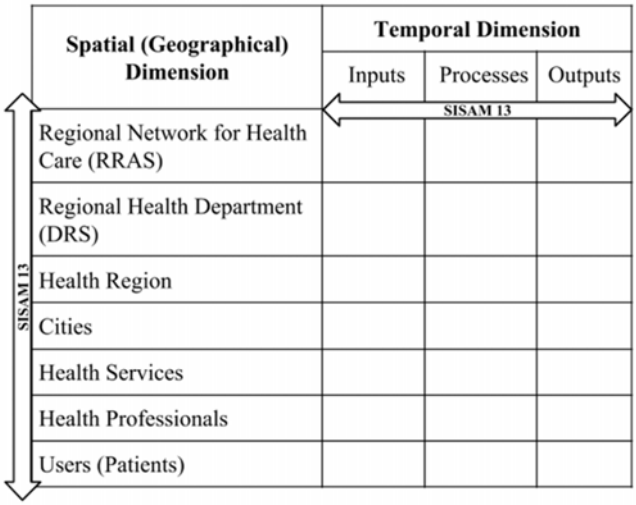

Fig. 1. The mental health matrix model of Thornicroft and Tansella[15] adapted to the XIII Regional Network for Health Care (DRS XIII) of the state of São Paulo, Brazil, including the operation of SISAM 13 as an integration tool.

From the temporal dimension of the matrix, which consists in three stages: input, process and output; is possible to identify a stream of events that occurs from the beginning to the outcomes of the intervention. In this flow, the authors consider that the outcome stage is the most important and the health organizations should be evaluated by the produced results.[15,16]

Therefore, the Thornicroft and Tansella's mental health matrix model[15] can be adapted to the reality of the Brazilian public health system as a heuristic to define health indicators and types of relationships between different services of the network. The Figure 1 represent one of the possible adaptations of this matrix. From this particular adaptation, this paper will focus on the management of mental health in its spatial (geographical) dimension within the municipalities and health regions of the DRS XIII.

2.2. Enterprise Architecture as an action model to evaluate the Psychosocial Care Network (RAPS)

The field of Enterprise Architecture (EA) studies the problem of alignment of the strategies of the organizations, either private or governmental ones, with their information systems[17,18]. Therefore, paradigms of research in EA will be used in this work as an action model to evaluate RAPS.

The EA emerged from the need to build, manage, monitor and evaluate complex systems in a coherent and consistent manner. The development of an EA allows the establishment of connections between the many sectors of an organization, its processes and the support systems ensuring the correct alignment of the information systems with the strategic aims of organizations.[17,18]

The EA field represents the intersection of several scientific areas, namely: strategy, clinical management, financial management, process management, logistics and operations, strategic management of information systems in healthcare and psychology.

3. Research methods

This work is an interpretative research. Interpretive studies usually try to understand human thoughts and actions in social and organizational contexts[19] and phenomena through the meanings attributed by the people as the situation arise[9]. Some uses of this perspective in Information System researches can be to make deep insights of how the information system influences and it is influenced by the environment[20], or also to understand the development and management of information systems[19].

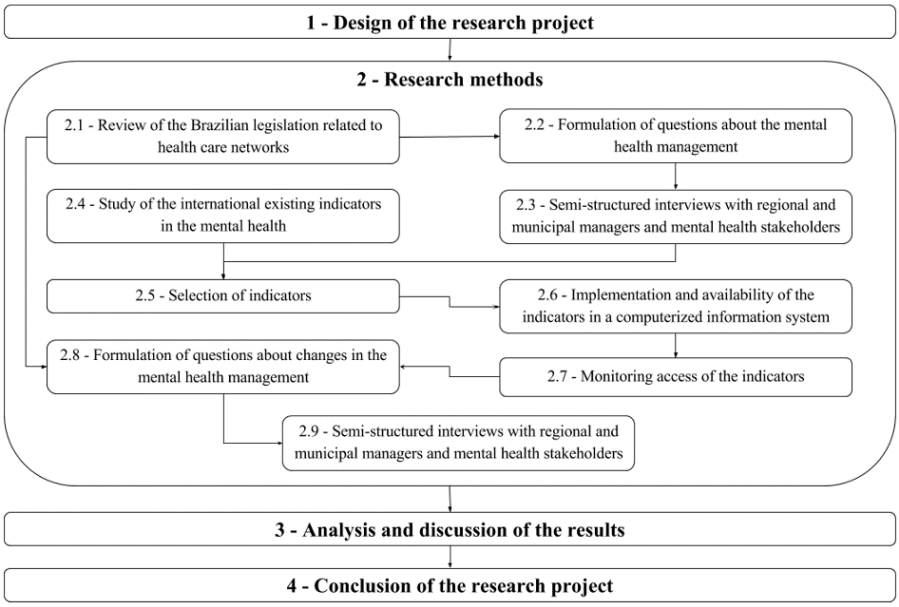

Fig. 2. Activities of the Research Process.

In this paper, we decided to use this particular approach because it allows obtaining a better understanding of the management of RAPS through the knowledge acquired and shared by its managers. Another reason is that it can bring more elucidation on the impact generated by the employment of a computerized information system, providing benefits in the management of the RAPS, and in how the professional interacts with the system. Thus, given the aim of this study, we considered this approach the most suitable and with better chances of bring betters results.

The Fig. 2 illustrates the steps of the research process presented in this paper and it was drafted in order to guide the understanding of them. The figure also presents the methods used in each step.

Thus, the first stage of the proposed model will be to conduct a review of the Brazilian legislation related to health care networks and, particularly, with psychosocial care networks[1-5,12]. This study aims to build a theoretical basis on how should be the performance of mental health management.

From the legislation and other reference materials acquired in this step, we will compile open and closed questions to assess the regional and municipal mental health management, emphasizing how is the actual performance of the management at each administrative level, the description of the processes involved and the indicators currently in use. Initially, the Zachman's framework[21] should support the acquiring of this information in a mental health network and, considering the reality of the network under study, it seems to be the most suitable due to its clarity and objectivity.

In this stage, the use of interviews as a data collection technique is appropriate in order to obtain the knowledge required from people who have extensive work experience in the field, specifically in mental health and health management.

The interviews seek the collection of objective and subjective data that relate to the values, attitudes and opinions of interviewees[22]. Their use occurs typically as an exploratory method to examine concepts, relationships between variables and to design hypotheses; as the main measuring instrument of an investigation; or as complement to other methods by validating or deepening their results[23].

Thus, the choice for semi-structured interviews, which is one of the forms of interviews, occurred because of their property in match closed or open predefined questions[22]. We will use a script containing the questions previous elaborated in the context of informal conversation. This will allow the interviewer to organize the interaction process with the interviewee and to have guidance of the discussion in order to obtain all the necessary information and to maintain focus on the theme[23,24].

Simultaneously, we will made a study of the existing indicators in the mental health field that are used in Brazil and other countries that have universal public health systems, by searching papers in the literature that describe such indicators, the way they are calculated and what are their uses. Moreover, we will choose to implement some of those indicators using the paradigms of EA accordingly to their contribution to the improvement of the mental health management in the region under study. Then, we will make them available to the users of a web computerized information system already in operation in the DRS XIII, the SISAM 13, due its use by all those involved with the mental health care in the region.

Using the Figure 1 as reference, we defined that the focus of this stage of the research should be on building the lines of municipalities and health regions of the adapted mental health matrix in the context of DRS XIII. That is, the main idea is the development of an information model of mental health actions that includes the dimensions of inputs, processes and results of the evaluation and management of services/interventions, covering all components of the RAPS in a municipal and regional level. Thus, this will result in the description of the overview of the mental health management and in the specific indicators common to the entire network.

Then, we will monitor the access of the indicators implemented in SISAM 13 for about six months. This monitoring will aim to obtain the frequency that each indicator is used and the user profile that used it, which may be a manager, administrative technician and/or doctor.

After the conclusion of this monitoring, we will perform another set of semi-structured interviews to evaluate the effective use of the defined and implemented indicators in the management of mental health in a municipal and regional levels, preferably between the same people who participated in the first round. The definition of the questions to be performed during this interviews will be similar to the previously ones, with the addition of specific questions to assess possible variations between periods.

Once the interviews are completed, we will evaluate the obtained results qualitatively and quantitatively along with the data of the monitoring of the indicators' usage in the information system. This analysis will aim to compare the final overview with the initial one, regarding the network management of mental health care, and if the use of computerized indicators influenced in this management.

4. Conclusion

The expected evaluation model resulted from the application of the proposed research methods in the RAPS of the DRS XIII should include all the management mechanisms used by the municipal and regional manager in mental health. This will allow the knowledge of the mechanisms already implanted in the network and the proposition of more appropriate ones, since there are no specific legislation in Brazil on how the management of the mental health network should occur. Another contribution should be the definition, implementation and availability of indicators used worldwide that can show the situation of the RAPS. The access to these indicators will be in real time for all professionals related with the mental health care, both the healthcare and the administrative areas. Hence, such professionals could evaluate constantly how is the mental health overview of their city and/or region by acknowledging how the mental health services are performed in order to result in actions that can support improvements in the management.

Some studies indicate that health services are not functioning as a network in many Brazilian states[25]. Thereby, the use of the proposed research methods in any specific localities will enable the expansion of local knowledge about mental health and the improvement of management and health care quality in the region, with a strong academic content. Their use could another benefits as allowing an alignment of the information systems with the network strategy, enabling the connection of the strategic objectives with operational day-to-day, the simulation of deployment options for public health policies and the monitoring of the execution of these policies.

The process of building these mechanisms also intended the creation of a health ecosystem for Mental Health Care Networks that can have their implementation generalized to others regions of Brazil, which the specific application in the region of Ribeirão Preto considered both a pioneering initiative as well as a trial for other regions. Thereby, it could also provide more qualified and humanized patient care.

References

1. Brasil (Ministério da Saúde). *Lei nº 8.080, de 19 de setembro de 199*0. Diário Oficial da União. Brasília, DF; 1990.
2. Brasil (Ministério da Saúde). *Portaria n° 95, de 26 de janeiro de 2001. Norma Operacional da Assistência à Saúde NOAS-SUS 01/2001*. Diário Oficial da União. Brasília, DF; 2001.
3. Brasil (Ministério da Saúde). *Portaria n° 373, de 27 de fevereiro de 2002. Norma Operacional da Assistência à Saúde NOAS-SUS 01/2002*. Diário Oficial da União. Brasília, DF; 2002.
4. Brasil (Ministério da Saúde). *Portaria n° 399, de 22 de fevereiro de 2006. Pacto pela Saúde 2006*. Diário Oficial da União. Brasília, DF; 2006.
5. Brasil (Ministério da Saúde). *Portaria n° 4.279, de 30 de dezembro de 2010.* Diário Oficial da União. Brasília, DF; 2010.
6. Vargas I, Mogollon-Perez AS, Unger J-P, da Silva MRF, de Paepe P, Vazquez M-L. Regional-based Integrated Healthcare Network policy in Brazil: from formulation to practice. *Health Policy Plan*. 2015;30(6):705–17.
7. Mendes EV. *As redes de atenção à saúde*. 2nd ed. Brasília, DF: Organização Pan-Americana da Saúde; 2011.
8. Giovanella L, Lobato LVC, Carvalho AI, Conill EM, Cunha EM. Local health systems and comprehensive care: criteria for evaluation. *Saúde em Debate*. 2002;26(60):37–61.
9. Viegas SMF, Penna CMM. The Brazilian Unified Health System (SUS) is universal, but quotas are the norm. *Cien Saude Colet*. 2013;18(1):181–190.
10. Serra CG, Rodrigues PHA. Avaliação da referência e contrarreferência no Programa Saúde da Família na Região Metropolitana do Rio de Janeiro (RJ, Brasil). *Cien Saude Colet.* 2010;15(6):3579–3586.
11. Barros REM. Re-internações Psiquiátricas – influência de variáveis sócio-demográficas , clínicas e de modalidades de tratamento [thesis]. Ribeirão Preto/SP: Universidade de São Paulo, 2012.
12. Brasil (Ministério da Saúde). *Portaria n° 3.088, de 23 de dezembro de 201*1. Diário Oficial da União. Brasília, DF; 2011.
13. Instituto Brasileiro de Geografia e Estatística (IBGE). *Censo Populacional*. 2010.
14. Yoshiura VT. Desenvolvimento e Implantação de um Sistema Web para Monitoramento da Rede de Atenção em Saúde Mental [dissertation]. São Carlos/SP: Universidade de São Paulo, 2015.
15. Thornicroft G, Tansella M. *The Mental Health Matrix*. Cambridge: Cambridge University Press; 1999.
16. Mângia EF, Muramoto MT. Matrix Model: a tool for the construction of good practice in community mental health. *Rev Ter Ocup Univ São Paulo*. 2009;20(2):118–125.
17. Tamm T, Seddon PB, Shanks G, Reynolds P. How does enterprises architecture add value to organisations? *Commun Assoc Inf Syst*. 2011;28(10):141–168.
18. Rijo R, Martinho R, Ermida D. Developing an Enterprise Architecture Proof of Concept in a Portuguese Hospital, *Procedia Computer Science*. 2015;64:1217-1225.
19. Klein HK, Myers MD. A Set of Principles for Conducting and Evaluating Interpretive Field Studies in Information Systems. *MIS Quarterly*, Spec Issue Intensive Res. 1999;23(1):67–93.
20. Myers MD. Qualitative Research in Information Systems. *MIS Quarterly*. 1997;21(2):241–242.
21. Zachman JA. A framework for information systems architecture. *IBM Syst J*. 1987;26(3):276–279.
22. Manzini EJ. Entrevista semi-estruturada: análise de objetivos e de roteiros. In: *Seminário Internacional sobre Pesquisa e Estudos Qualitativos.* Bauru, SP; 2004:10.
23. Fortin MF. *O processo de investigação: da concepção à realização*. 2nd ed. Loures: Lusociência; 1999.
24. Boni V, Quaresma S. Aprendendo a entrevistar: como fazer entrevistas em Ciências Sociais. *Em Tese - Rev Eletrônica dos Pós-Graduandos em Sociol Política da UFSC*. 2005;2(3):68–80.
25. Paim J, Travassos C, Almeida C, Bahia L, Macinko J. 2011. The Brazilian health system: history, advances, and challenges. *Lancet*. 2011;377(9779):1778–97.