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A Soft Systems Approach to Understand the Impact of Health Information on Patient Care

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#### Abstract

The improvement of quality of health care has demanded for new methods to measure the impact of all the elements involved in the health-care process. Apart from human resources, money, equipment, time and materials, "information" and "knowledge" are key resources in this process. Its "impact", "value" and "relevance" however, is still being explored through several approaches. The purpose of this work is to present the preliminary results of a research in progress on the impact of information access and use at the structure, process and outcome levels of a health care system. Checkland's soft systems methodology is used as an approach to (1) structure the problem situation; (2) develop conceptual models, relevant to the problem situation; (3) generate a debate amongst the actors involved, regarding impact indicators; and (4) establish consensus to measure such impact. While the research is limited to a "primary health care" setting, the models obtained through the use of the methodology provided insights into the understanding of the role that information plays on patient care. The implications to quality of health and to all the actors involved, including policy makers, health practitioners, librarians and patients, are described by the author.

## 1. Introduction

The last two decades of the twentieth century are recognised as a period of extraordinary fertility in biology and biomedicine. Curative and preventive developments in acute and chronic diseases have been obtained. Throughout this era of modern medicine, physicians have constantly risen to the challenge of resolving difficult problems; this process of resolution has provided intellectual stimulation and the satisfaction of improving the human condition.

Medicine has indeed reached new pinnacles in providing benefits to patients, but the care provided today is also highly complex. The concerns now being raised about patient care have been buttressed in part by well performed studies that suggest that physicians do not consistently apply available knowledge in the care of patients and that uncertainty about the most effective diagnostic and therapeutic approaches is pervasive [1-3]. This observations, as well as the financial incentives to conserve resources, the growth of for-profit hospitals and demands from purchasers, are among the forces increasing the need for improved methods that measure quality in health care [4, 5]. This has become a public policy issue.

Quality assessment is a vehicle for reaching the elimination or reduction of aberrancies of care, and the improved provision of care as it is performed today. These objectives, as end-products, can be attained only through the appropriate gathering and use of scientific and technical information. Information plays an important role, not only as an element in a transformation process within a health care system, but also in decision making and in quality of care.

According to Donabedian [6], in order to assess quality of health, information needs to be available at all levels of health care; that is, at the structure, process and outcome levels. In order to assess the impact of information on quality of health care however, information needs to be not only "available", but "used" and administered as a resource. With this rationale, improvements in the use of information at the structure level of health care would lead to improvements at the structure-process and outcome levels.

In this context, the following questions emerge:

How important is information "access" and "use" at the different levels of the health care need-provision process, from top managerial, down to the patient/community level?.

What type of information is needed at each level and what/which is its role in relation to patient care, along with other elements such as money, time, materials and equipment?

Are the new information technologies improving the health care need-provision process?.

What would be the impact of information technology on quality of health care?.

How would such impact be assessed?.

These what/how questions integrate what Checkland [7] calls a "problem situation". Their answers have profound implications to health care managers/administrators, physicians, patients and librarians/information scientists, to mention but a few actors involved in the health care system. Up to date, published results indicate that the evaluation of the impact of information on the quality and cost of health care is reduced to the feedback from users' comments on questions that current literature "directly influenced" the management of specific patients [8, 9]; or that having the "key article" is as important as having the laboratory investigation reports [10, 11]. As for the evaluation of hospital libraries, the assessment techniques have provided little insight into the effect of library services on patient care [12, 13].

# 2. Purpose

The purpose of this work is to present the preliminary results of a research in progress on the impact of information access and use at the structure, process and outcome levels of a health care system. The aim of the research was to design a model whereby the assessment of information and its impact, as related to patient care, could be analysed. This work derives from the results of a PhD. research in the field [14] and from the experience gained in a case study [15].

## 3. Method

Checkland's [7] soft systems methodology (SSM) was used as an approach to the "problem situation" mentioned above. In his first model of the methodology, Checkland identified two kinds of activities in problematic situations. Stages 1, 2, 5, 6 and 7 were "real world" activities necessarily involving people in the problem situation; and stages 3 and 4, were "systems thinking" activities which could or could not involve those in the problem situation, depending upon the individual circumstances of the study. This model thus divides the approach into two concepts; one being the "real world" situation, and the other, the "systems thinking" activities that conduct the analyst to obtain conceptual models that are relevant to the "problem situation" in the real world. This approach is both systemic and systematic.

More recently, Checkland and Scholes [16] enriched the methodology with a stream of cultural analysis, considering for example, elements of "power" and "politics" in the organization and therefore in the construction of the models. Figure 1, describes how SSM was used to design a model regarding the impact of health information on patient care. Here, a Problem Content System (PCS) and a Problem Solving System (PSS) are identified, and the researcher plays the role of "owner" of both systems.

Through the use of SSM, the PCS was initially structured and defined. Then, different conceptual model that were regarded as relevant to the PCS were developed. The research will continue with the following two steps: (1) a debate will be generated among the actors involved, in a "real world" case-study; and (2) a consensus will be established so as to assess the impact of information on patient care.





Key:

PCS: Problem Content System PSS: Problem Solving System SSM: Soft Systems Methodology

Figure 1. A systems approach to obtain a model regarding the assessment of the impact of information on patient care

#### 4. Results

The preliminary results obtained are summarized in the model illustrated in Figure 2. This figure describes the use of the methodology at the structure, process and outcome levels of health care. At the "structure" level for example, the interest resides on the assessment of the impact regarding the access and use of information at the managerial level; for instance, on the impact of information at the planning and coordination of a program on the prevention and control of sexually transmitted diseases at the primary level of health care. Similar examples are provided for the "process" and "outcome" levels.

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The model thus provides for the observation and action regarding information access and use in a tri-dimensional scale. In theory, It would be a never-ending process of analysis to improve quality of care from the information perspective.

# 5. Discussion and Conclusion

The hypothesis underlying this work is that a soft systems approach can be used as a methodology to understand and learn about the role that information plays in a health care system. It was estimated that through the inquiry process of SSM, results could contribute to obtain a model whereby the value and impact of information on patient care be assessed. Following Donabedian's model of the assessment of quality of health care [6], information can also be assessed as an important resource in the transformation processes that take place within the health care need-provision system. In this research, this was explored at the different levels of structure, process and outcome. The model obtained therefore provides some insights into the assessment of quality of health care from the information science point of view.



PCS: Problem Content System SSM: Soft Systems Methodology

Figure 2. A soft systems approach model to assess the impact of information on patient care, at the structure, process and outcome levels of a primary health care system. The benefits and implications derived from the application of the model may be multidisciplinary. Policy makers and health managers for example may benefit from using the model at the structure level in order to improve their plans and programs; i.e., improve quality of health from the structure level. Similarly, health practitioners may benefit from the model once they identify their role as actors in the "process" level and explore their information needs and demands, as related to patient care. Finally, librarians, information specialists and patients may also find their place in the model as key actors in the access and use of information to improve the outcomes of health care.

The limitation found in the use of SSM was its reduced application to specific "human activity systems" and therefore, its lack of "replicability". Nevertheless, the "systems thinking" processes involved provided a path into the understanding of the role of information on patient care. Further interdisciplinary research is needed in order to develop models at different levels of resolution and to corroborate their value against other systems models. This type of research is urgently needed in order to improve the methods that better assess quality of health care.

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