



Research Article

Mapping and Changing Informal Nurse Leadership Communication Pathways in a Health System



David C. Benton, PhD, RN, FRCN *

International Council of Nurses, Geneva, Switzerland

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SUMMARY

Purpose: Social network analysis (SNA) is increasingly being used to provide a visual and quantitative analysis of relationships among groups of staff and other subjects of interest. This paper examines the role SNA can play in identifying existing networks, and measures the impact of participation in brief task-focused project groups on the underlying communication pathways.

Methods: An SNA of a closed group of nurse leaders was conducted in a health system in Scotland, UK. Data were collected on two occasions 6 months apart. Analysis of both whole network and individual node-based (nurse leader) measures were undertaken.

Results: Analysis revealed that the initial network structure was related to functional departments. By establishing task and finish groups, network density and other key measures could be improved.

Conclusions: SNA is a useful tool in mapping existing networks and evaluating how these can be strengthened through the use of task orientated project work. This easy-to-use technique can provide useful insights and a means of targeting management action to improve communication pathways in a moderately large and complex nurse leadership group. Further clinical and academic potential uses of the technique are suggested.

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Introduction

The purpose of this study was to examine the role that social network analysis (SNA) can play in identifying and altering communication pathways within nursing leadership in a single health system in Scotland.

In today's rapidly changing health care delivery environment, organizational redesign, mergers, efficiency targets and performance benchmarks are all terms familiar to many nurse leaders [1]. While getting to grips with these challenges, newly appointed nurse directors often initially find it difficult to navigate large and increasingly complex organizational structures. These structures often place the nurse director in a leadership role where they have no direct reports. In such circumstances they have to use their influencing skills to bring about professional change. At the other extreme, they can have unrealistically large spans of control brought about as a result of deletion of middle managerial positions. In the latter case the newly appointed director can face

frequent demands for day-to-day management and guidance support that can consume a great deal of time and energy [2].

Hatala and Lutta [3] have noted that it is widely accepted that information sharing and effective communication is central to successful organizational functioning. Van den Bulte and Wuyts [4] have stressed the positive impact that word-of-mouth communication between colleagues can have. Van den Bulte and Wuyts also suggested that the judicious use of such pathways should not be underestimated as a potentially powerful communications tool [4]. Additionally, Morberg et al. [5] and Hoppe and Reinelt [6] have highlighted the centrality of information management as a key approach to securing organizational success in increasingly competitive and demanding environments. At this time of almost constant change, it is useful to recall the work of Rogers [7] who repeatedly identified the impact on increased early adoption of innovation when the opinion leaders at the center of organizational networks were themselves early adopters. These authors have one thing in common—the value they place upon communication networks.

In recent years there has been an increase in the use of SNA or organizational network analysis [8]. These techniques can be a valuable approach in mapping and analysing information sharing

* Correspondence to: David C Benton, PhD, RN, FRCN, International Council of Nurses, 3 Place Jean-Martheau, Geneva 1201, Switzerland.

E-mail address: dcbenton.swiss@gmail.com

structures [9,10]. SNA can identify those members of staff who play pivotal roles in either the transmission or blocking of information. Hence, with today's pressure to deliver results, newly appointed nurse directors need to find ways to leverage established networks. According to Cross and Thomas [11], from data collected in the corporate sector, information flows and organizational performance can be greatly improved by making a few well-placed changes to the structure of the social network within an organization. Although these results were based on work in the corporate sector they do beg the question as to whether SNA may be a useful tool for elaborating information flow amongst nurse leaders, and if their underlying network structures can also, through some form of intervention, be changed for the better.

Defining key terms

Central to the construction and analysis of social networks is familiarity with a number of key terms and measures [12]. It is not the intention to provide a comprehensive description of all measures that can be used for SNA in this paper as these can be found in a number of methodological texts on the subject [5,9,13]. Instead, only those terms and measures used by the investigator and commonly identified by other researchers as being useful in exploring organizational performance and measurement of change are described [14–18].

The focus of any SNA is based upon an examination of “nodes/actors”. A node is the term used to describe the person, species or organization under investigation. The connection of one node to another, by use of a connecting line (tie), indicates a flow of information. The flow can be either unidirectional, from node A to node B, or bidirectional where information flows in both directions. The direction of the flow of information is indicated by the presence of an arrowhead starting at the originator of the communication and pointing to the recipient. The “indegree” of a node or actor is the number of people who go to that person for information and the “outdegree” of a node or actor is the number of people that they go to for information. The measurement of indegree can be used to identify those actors who are most sought out for information. A high outdegree score can indicate individuals with a good understanding of where particular expertise lies within the network. These two scores can be combined to form the measure “degree connectedness”, which provides an indication of how easily a particular actor communicates with other members of the network thereby offering an indication of power and potential influence. “Closeness centrality” is a measure of the extent to which an individual node is connected to all other nodes and is an indicator of the extensiveness of involvement in communication relationships with other actors. “Betweenness” is used to identify which of the actors in a network are brokers of information between otherwise poorly connected groups or subgroups of people. Cross and Thomas [11] assert that, although brokers may not have the most number of connections in a network, their pivotal function in connecting subgroups make identification of such members important when considering the overall effectiveness of information flow.

There are a number of measures that can be used to assess the health of a network. “Network density”, which is the number of actual connections divided by the potential total number, provides a measure of the extent of the interactions within the structure and can be used to assess the degree to which a group is likely to be viewed as inclusive [9].

Another useful measure in examining network topography is the “average path length”. This concept is defined as the average number of steps along the shortest paths for all possible connections of pairs of individuals in the network. It is a measure of the

efficiency of information flow of a network. The lower the number the more efficient information flows across the topography.

The “network diameter” of a social network is the number of links in the shortest path between the furthest pair of nodes. It therefore provides a measure of how expansive a network is and the number of transmission steps it will take to ensure information is fully communicated to all individuals.

Methods

This quasi-experimental, pre-post intervention design study focused on a defined group of nurse leaders working within an integrated health system. The study entailed after the initial data collection the use of an intervention where three groups worked independently to complete one of three educational tasks constructed to influence the underlying social network structure as documented by pre-intervention data collection.

Setting and sample

The health system located in the North East of Scotland encompassed a number of hospital sites ranging from small rural units (cottage hospitals) right up to and including a multisite university teaching hospital including tertiary specialist services. In addition, as the delivery system was fully integrated, the responsibilities of the nurse director also encompassed all community-based nursing services such as school nursing, district nursing teams, community midwifery and health visitor services.

Subjects recruited to the study were nurse leaders who were operationally defined as any nurse, who occupied a management position and who had responsibility for the professional leadership and supervision of nurses, in three or more wards, departments, services or community based teams. The entire population of nurse leaders working in the health system who met the inclusion criteria were invited to participate.

Ethical considerations

SNA is said to have a number of specific ethical challenges. Borgatti and Molina [19] have fully explored these issues, and offered explicit guidance on this important issue in their seminal paper on the ethics of conducting network research within organizations. This guidance relating to protecting anonymity, presenting data in aggregated form and offering multiple opportunities to opt-out of the study was carefully followed.

Approval for the study was sought from three different sources: the ethics committee, which normally focuses exclusively on clinical research involving human subjects; the senior management team for the health system to secure employer perspective support; and the staff representative body who are guardians of employee rights. All three entities gave approval.

Each subject received an explanation of the study and, in particular, how data would be collected, and fed back to participants. All potential subjects were given the option to decline participation and a written agreement to their participation was obtained prior to commencement of data collection. Furthermore, participants were advised that anonymity would be protected by use of numbers rather than names in any visualizations of the network or in the reporting of any analysis.

Instruments

Participants were given a pen and paper based self-completion questionnaire. The questionnaire took 3–5 minutes to complete. As recommended by Clark [10] the data collection instrument was

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