

# The Role of Head Nurse on Communication: A Social Network Approach

Chia-Hui Wang, Kathryn Anthony, and Nai-Wen Kuo

**Abstract**—Head nurses play important roles in communication among staff. However, there is no evidence to confirm to what extent physicians and nurses rely on head nurses to communicate. This study was designed to explore the importance of head nurses in communication among physicians and nurses. Using 11 nursing units of two hospitals in Taiwan as examples, we applied social network analysis (SNA) on analyzing networking properties among staff to see the role of head nurses in communication. Results of SNA showed that the ranges of network centralization for interaction and advice-seeking networks were from 19.85% to 81.82%. Therefore, it is important to enhance the communication skills of head nurses. Equipment and technology to facilitate communication among providers are also very important.

**Index Terms**—Social network analysis, network centralization, communications.

## I. INTRODUCTION

There are many expectations for the roles played by head nurses. In addition to planning, organizing, and directing health services provided by staff nurses in nursing units, head nurses have to mentor, facilitate and evaluate junior members. Sometimes, head nurses need to coordinate staff nurses or communicate with physicians within or between units. To fulfill these expectations, communication is one of the most important competencies that head nurses must possess.

### A. Importance of Communication in Health Care

The role of communication in healthcare teams is critical. An Australian study suggested that poor communication wastes time, threatens patient care, and may be one of the leading cause of preventable adverse events in clinical practice [1]. Barriers to effective teams and communication include different professions (disciplines), educational background, large team size, instability of the workforce and assignments, the absence of a common purpose, and inappropriate physical environment (e.g., lack of space and overcrowded spaces, design and layout of work stations) [2]-[4].

Some articles indicate that poor communication among physicians and nursing staff is a common phenomenon. For

examples, physicians often are reluctant to accept opinions from nursing staff. Additionally, inaccurate vocabularies used among providers may also lead to poor communication. Poor communication among physicians and nursing staff often negatively impact patient care quality, especially during patient care or transferring processes. The effects of poor communication may cause harm to patients [5], [6]. As a result, effective and good communication is the basis for providing quality patient care and ensuring patient safety.

Traditionally, the nurses' station is the place for entering orders, notes and observations into the chart as well as a space for the clerk(s), a few small work spaces for nurses or physicians to sit down to write and a small space for physician dictation. In the past, a major effort of nurses' station design was tried to facilitate such chart handling by many people without the chart being lost. In addition, the nurses' station should be able to create an environment for friendship and teamwork.

### B. Significance of This Study

Nursing unit is one of the most important spaces in hospitals. Within a nursing unit, nurses' station is an imperative space in support of staff's practice. Appropriate design of nurses' station should be able to restructure the practice of healthcare staff and fulfill the needs of patient care. In today's medical society, due to rapidly changing professional practice, nurses' station should be designed as a space for senior staff to pass on their experience and knowledge to their junior colleagues so that nurses' station can be a space for accumulating experience and knowledge, as well as mentoring.

The design of nurses' stations can be categorized into two broad categories: centralized and decentralized. Each has its own advantages and disadvantages.



Fig. 1. Floor plan of a sample centralized nursing unit.

The floor plan of a centralized nursing unit in this study is

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showed on Fig. 1. Typically, a centralized nursing unit equips with a central service core including nursing station, conference room, duty room, and storage, etc. Since the centralized nursing station provide a space for gathering, it is easier for nursing staff and medical staff getting together. Therefore, theatrically, it is easier for nursing and medical staff to communicate within a centralized nursing unit as the centralized nursing station serves as a central hub for communication.

There are several advantages of decentralized nurses' stations, for examples, less time walking, more time on patient care, less socialization leads to decreased noise, etc. On the other hand, there are also some drawbacks of decentralized nurses' stations. In a decentralized nurses' station, nurses feel isolated, insecure of own capabilities. In this situation, it is more difficult for nurses to support each other in case of emergency. Additionally, supplies also need to be decentralized for full efficiency gains. Moreover, a higher nurse-patient ratio is also needed in a decentralized nurses' station, increasing the operating costs. However, the most serious disadvantage of a decentralized nurses' station should be the problem of communication among nurses, physicians and staff since there is no any central hub for communication within the nursing unit and all the nursing staff are deployed to bedside. Thus, the communication among staff should mainly rely on head nurses. Fig. 2 shows the floor plan of a sample decentralized nursing unit (hybrid). In this model, there are four satellite sub-stations in this hybrid nursing unit. Each of the four satellite sub-stations accommodates two nurses and is responsible for caring 6 patient rooms. Even though the hybrid model is better than a completely decentralized nursing unit (alcove style) in terms of mutual assistance among nursing staff, communication among nursing and medical staff is still more difficult than that of a centralized nursing unit.



Fig. 2. Floor plan of a sample decentralized nursing unit (hybrid).

Head nurses play an important role in communication among staff. However, there is no evidence based on original research to confirm this theory. To what extent do physicians and nurses rely on nurse managers to communicate? Is there any difference of head nurses' degree of importance in communication in different nursing unit configurations? This study was designed to answer these research questions. The researcher applied a state of the art research tool and computer software, social network analysis, to carry out this study and answer the abovementioned research questions.

## II. METHODOLOGY

### A. Research Process

We conducted questionnaire surveys for self-reported data on personal information (gender, age, education, occupation, and length of work experience), staff (nurse-physician) interaction and advice-seeking activities in the nursing unit. Afterward, we applied social network analysis to analyze networking properties among staff to see to what extent physicians and nurses rely on nurse managers to communicate in different nursing unit configurations.

### B. Research Settings

We carried out this research at two hospitals in Taiwan: one hospital equipped with conventional centralized nurses' stations and the other equipped with decentralized nurses' stations. The proposal was approved by the institutional review board (IRB) of one sample hospital in 2010.

According to the hospital accreditation system in Taiwan, Taiwanese hospitals can be categorized as a medical center, regional hospital, or district hospital. In this study, both hospitals are regional hospitals in Taiwan, offering good quality of data reporting for research.

### C. The Samples

We surveyed 305 physicians and nurses working in 11 nursing units of the two hospitals to see the degree of centralization for both advice-seeking and interaction networks, which implied the extent that physicians and nurses rely on nurse managers to communicate in their advice-seeking and routine patient care activities. The 11 nursing units include 6 conventional centralized nurses' stations (2 rectangle and 3 triangle configurations) and 5 decentralized nurses' stations (1 traditional alcove-style and 4 hybrid decentralized stations). Altogether, 273 valid questionnaires among the 305 staff were collected (Table I).

TABLE I: SAMPLE DESCRIPTION (N=273)

Variables	Number	Percentage (%)
Gender		
Male	38	13.92%
Female	235	86.08%
Education		
High school	0	0.00%
Junior college	121	44.32%
College	142	52.02%
Post graduate	10	3.66%
Profession		
Physician executive	7	2.56%
Attending physician	20	7.33%
Resident	16	5.86%
Nurses manager	13	4.76%
Staff nurse	196	71.80%
Administrative staff	9	3.30%
Other (technician..etc.)	12	4.39%
Total (n)	273	100%

### D. Measures

To understand the advice-seeking and interaction networks of each nursing unit, we conducted a self-administered questionnaire for 305 participants. First, we provided each of the participants a complete list of physicians, nursing staff, administrative, and other staff who work in the nursing unit at first. Next, we asked each participant to answer the following two questions.

- 1) Please identify the colleagues that you have sought for advice when you encountered difficulties for your daily work during the past three months and what is the frequency of seeking their advice (several times per month, several times per week, and almost everyday).
- 2) Please identify the colleagues that you have interactions for your daily work during the past three months and what is the frequency of interactions between you and your colleagues (several times per month, several times per week, and almost everyday).

Centralization of advice-seeking networks and centralization of interaction networks were measured to identify the extent that physicians and nurses rely on nurse managers to communicate in their advice-seeking and routine patient care activities. After collecting 273 valid self-reported questionnaires on advice-seeking and daily interaction behavior, we were able to calculate network centralizations of both advice-seeking and interaction networks for each nursing unit. Analysis was conducted using UCINET (University of California Irvine Network Program). Network centralization is a number between 0 and 1. The highest centralization is 1(100.00%) while the lowest one is 0 (0.00%). Network centralization measures the degree to which an entire network is focused around a few central nodes [7]; i.e., communication is "dominated by a few person." This study applied network centralization to describe the degree of centralization for both the advice-seeking and interaction networks among different configurations of nursing units. This indicator can also be called "Group Degree Centralization." Its formula is listed below [8].

$$C_D = \frac{\sum_{i=1}^g [C_D(n^*) - C_D(n_i)]}{[(g-1)(g-2)}$$

$C_D$ : degree centrality

$g$ : number of members in that network;

$C_D(n^*)$ : maximum of degree centrality observed in that network.

According to Mizruchi and Galaskiewicz [9], high network centralities are correlated with reputations of power and influence over network members. Thus, centrality is commonly used to identify network leaders.

### III. RESULTS

Results showed that staff working in nursing units, including physicians and nurses, heavily relied on head nurses to communicate, both for advice-seeking and daily patient care activities no matter if they were located in decentralized or centralized nursing units. Communication among staff within a completely decentralized nursing unit is more difficult and rely head nurse more than that of a centralized nursing unit. Fig. 3b) shows that interactions (communications) among staff are much less in a completely decentralized unit.

In terms of advice-seeking, 19.85% to 67.46% of the advice-seeking activities occurring in the 11 nursing units relied on communication through head nurses. On the other

hand, 29.78% to 81.82% daily patient care interactions depended on communication through head nurses (Table II).

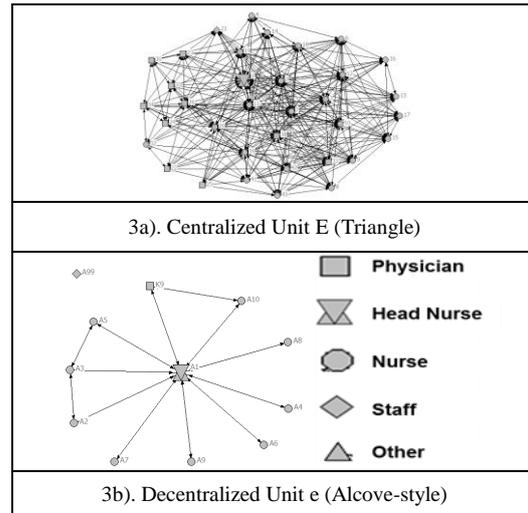


Fig. 3. Sample diagrams of interaction networks of SNA.

TABLE II: CENTRALIZATION OF NETWORKS IN NURSING UNITS

Types of Nurses' Station	Centralization of Advice-seeking Networks	Centralization of Interaction Networks
Centralized Nursing Unit		
A (Rectangle)	19.85%	38.48%
B (Rectangle)	32.78%	34.62%
C (Triangle)	67.46%	60.63%
D (Triangle)	40.69%	49.44%
E (Triangle)	27.66%	30.54%
F (Triangle)	32.19%	33.62%
Decentralized Nursing Unit		
a (Hybrid)	47.25%	29.78%
b (Hybrid)	44.58%	41.75%
c (Hybrid)	41.27%	32.14%
d (Hybrid)	45.38%	49.49%
e (Alcove-style)	60.61%	81.82%

### IV. DISCUSSION

There are some significant findings in this study. First of all, in general, degree of centralization for both advice-seeking and interaction networks of decentralized nursing units are higher than those of centralized nursing units except the nursing unit C. Among the 5 decentralized nursing units, "nursing unit e," which is an alcove-style nursing unit, has the highest degree of centralization due to its nature of design. Alcove-style nursing unit is a completely decentralized nurses' station usually put the nurses' station at room side without any type of central work area or communications hub spaces. Although such kind of complete decentralization may maximize "nurse-patient time," however, the disadvantages include lack of a major point for social interaction of the staff, and lack of an important space for sharing their clinical experiences. The design of completely decentralized nurses' station often overlooks that mentoring is a critical function in a health care setting and promoting mentoring should be an important goal for nurses' station design. Therefore, nurses working at a decentralized nurses' station typically rely on head nurses to communicate with other medical or nursing staff. As a result, degree of centralization is higher in decentralized nursing units, especially for the completely decentralized nurses' station

Secondly, degrees of centralization for advice-seeking and interaction networks are close in some units while some units are not. This phenomenon may be due to the nature of patients cared by different specialties of physicians. However, the authors do not have sufficient information and evidence to confirm this hypothesis. This is one of the major limitations of this study.

To ensure an environment for better communication within nursing units, Flynn proposed a “hybrid” solution which retains the decentralized nursing station format to keep the nurses close to their patients, but provide a central nursing station where private consultations and greater collaboration could take place [10].

## V. CONCLUSIONS

Analysis from the social network analysis of this study showed that the ranges of network centralization for both interaction and advice-seeking networks ranged from 19.85% to 81.82%. The results further suggest that physicians and nurses heavily relied on head nurses to communicate in their nursing unit both for advice-seeking and daily patient care activities. The head nurses play a crucial role in assisting communication among staff, especially in those decentralized stations. Therefore, it is important to enhance the communication skill of head nurses. Equipment and technology to facilitate communication among providers are also very important.

This study also demonstrates that the social network analysis is a useful approach in communication related research.

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