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Using variance analysis to detect mismatches in role expectations in patient physician interactions in obstetric work systems

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A socio-technical systems role analysis was conducted with patients and care providers at a midsize hospital in the United States. Participants in each group were asked how they viewed their role in the care proving process and how they viewed the role of the other group. Results indicate variances between how patients and providers see the role of the provider and how patients and providers see the role of the patient. Implications relative to work system improvement are discussed.

INTRODUCTION

Patient/ provider interactions are the defining components of doctor patient relationship and the basis for patient/ provider trust relationships. Patients' perceptions about their role in care provider relationships have been linked to attitudes about their illnesses and perceptions of recovery (Brody, Miller, Lerman, Smith, & Caputo, 1989 Smith, & Caputo, 1989). Mutual understanding of work roles and expectations have been associated with higher satisfaction (Krupat, Yeager, & Putnam, 2000). Patient trust in provider has been linked to important health system quality indicators such as patients adhering to medical advice, pursuing malpractice litigation and seeking healthcare services (Pearson & Raeke, 2000). Role analysis is an important step in analyzing and redesigning work systems (Hendrick & Kleiner, 2001). It is instructive to investigate the formal organizational roles as well as the perceived, that is, what members of the work system believe their role and interactions are expected to be. Work related roles in health systems, responsibilities and expectations are important aspects of patient provider care relationships. Mismatches in these roles can lead to interruptions in the work process and distrusting attitudes from both patients and providers, which could lead to system breakdowns.

Role Analysis

A system scan defines the work place in system terms, which also identifies and defines boundaries around the work system (Hendrick & Kleiner, 2001). A system scan for a health care system can show that patients have several potential roles in the system as inputs, customers, users, and as outcomes (Kleiner, 2007) (see Figure 1). A role analysis was

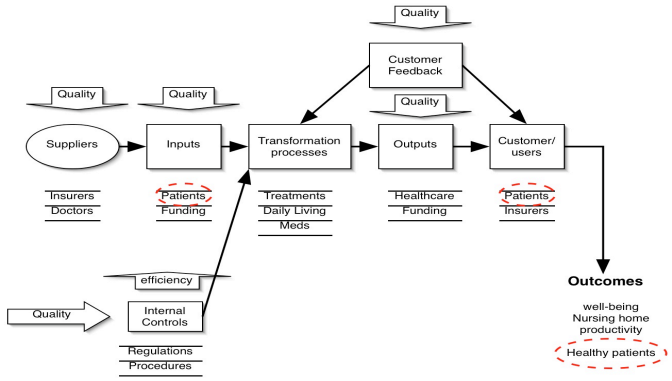

Figure 1. System model of nursing home work system Source: Kleiner, B. M. (2007). Sociotechnical system design in health care. In P. Carayon (Ed.), *Handbook of*

Human Factors and Ergonomics in Health Care and Patient Safety. Mahwah: Lawrence Erlbaum Associates.

conducted for both participant groups, to explore the perceptions of patients' and workers' roles. The collected data are part of a larger study that explores patients' and care providers' attitudes about the technology used in the care providing process. Kleiner (2007) argues that while job descriptions exist, humans' actual work behaviors (work roles) are the result of the actions, reinforcements and expectations from others (called the role set). A role analysis examines the relationships in the work system and describes the effectiveness of these relationships in terms of congruence and variance (Kleiner, 2007). For example, a patient who sees their role as a customer, rather than an input or entity to be worked on, may feel entitled to request more technology. A provider who sees the patient as a customer may feel obliged to honor requests for technology, thus reinforcing the patient's work role. These relationships are important factors to consider when defining trust in medical technology as it applies to both patients and providers.

METHODS

In this study 25 patients and 12 providers were interviewed in an obstetric work system at a midsized hospital in the United States. Participants were asked about their understandings of their own roles as members of the work system and the role of the other member (patient or provider respectively). Patients were asked, what they believed their care provider's role to be during their pregnancy and child's birth and what their own role was. Care providers were asked about their patients' role and their own role as a provider. A content analysis method was used to organize participant data; responses were reduced to codes that classified each line of participants' narratives (Krippendorff). Codes were created using participants own words; preliminary codes were then grouped with analogous codes to create families, which were quantified for comparison. Data were analyzed using variance analysis, where code families for patients and providers were compared to identify similarities and variances between groups (Hendrick & Kleiner, 2001).

Participants

Participants in this study were patients and providers in an obstetric work system. The sampling method was a combination of a maximum variation and convenience sampling methods, which seeks to document diverse experiences within a participant group (Creswell, 2007).

Demographics

25 patients and 12 obstetric health care providers participated in individual interviews. All patients gave birth in a hospital, were diagnosed as low risk during pregnancy and were between the ages of 18 and 35. Patients ages ranged from 19 to 35; 17 participants self identified as white or Caucasian, 1 participant identified as Asian and 1 as Hispanic, 5 participants identified as Black or African American. The participant's number of children ranged from one to four, 12 mothers had one child, 9 had two children, 4 had 3 children and 2 had 4 children.

Materials

Handheld audio recording devices were used to conduct the role analysis. During the interviews field notes and observation were also recorded on paper. Some interviews were conducted via telephone, for those interviews, handheld audio recording devices were used with adapter that allowed the phone conversation to be recorded.

Measures

Two questions were asked as measures for the role analysis, each participant was asked how they viewed their role as either a patient or provider and how they viewed their patient's or provider's role respectively.

Procedure

Interviews were conducted due to the infeasibility of recruiting participants for focus group sessions. Participants were told about the study from a provider stakeholder at Carilion Medical Center. Participants were contacted via

telephone to secure a time to conduct the interview. Interviews took place in the provider's office or a private location that allowed for confidentiality. During the interview participants were given the informed consent form. Once consent was given orally participants were be reminded that the interview would be audio recorded and that confidentiality would be kept. Written consent was not provided so that no identifying information from patients or providers would be recorded. Next the interview was conducted.

Analysis

Verbatim transcripts were created for each interview. During each interview, notes on salient themes were recorded during and after the interview. Each entire transcript was coded line-by-line for key ideas using a grounded theory coding scheme (Charmaz, 2006; Glaser & Strauss, 1967). After initial coding, like codes were joined to create larger codes. The codes were then organized by patient or provider and then compared.

RESULTS

In response to patients' understandings of their own roles, 102 open codes were created during a line-by-line coding procedure; of the 102 codes, 16 families were created. In response to patient perceptions of their care providers' role ninety-two open codes and 16 families were created. In response to providers' understanding of their own role 46 codes and seven code families were created. In response to care providers' perception of patient roles 75 codes were created and reduced to seven code families. Results suggest a range of mismatch in understanding of roles by both patients and providers.

Patient/ Provider Role Analysis

Patients were asked "What in your opinion is the care providers role/ job or responsibility with regards to your pregnancy/ child's birth?" One hundred and two open codes were created during a line-by-line coding procedure. Codes were created in vivo, meaning participants own words were used to create codes. Codes were then categorized into code families using the qualitative analysis program atlas.ti. Code families grouped codes with similar meanings and definitions. Of the 102 codes, 16 families were created. Families are discussed in order of their groundedness (number of codes in each family):

1. Keep baby and mom healthy (25)
2. Communicate (13)
3. Personal attention (11)
4. Good outcomes (10)
5. Manager (10)
6. Tell problems/ disclosure (8)
7. Listen (6)
8. Explain things (6)
9. Disclose risk (5)
10. Invitation to participate (4)
11. Consultant (4)
12. Provide best care (3)
13. Be flexible (3)
14. Shift roles (3)
15. Be open-minded (2)

Patients were also asked what they felt their role was concerning their pregnancy and child's birth. Ninety-two open codes were created during a line-by-line coding procedure. Of the 92 codes, 16 families were created:

1. Do independent research (20)
2. Communicate with doctor (19)
3. Ask questions (13)
4. Passive/ be taken care of (8)
5. Be proactive (6)
6. Be honest (6)
7. Be skeptical/ power (6)
8. Let doctors do job/ don't get in their way (5)
9. Understand (5)
10. Don't totally rely on doctor (4)
11. Work together (4)
12. Be personal advocate (3)
13. Express needs
14. Manners (3)
15. Make decisions (2)

Care Providers were asked what they saw their patients roles as. Of the 46 codes, seven code families were created:

1. To take care of themselves (9)

2. To learn (7)
3. Patient determines their role (7)
4. Tell provider things (6)
5. Listen to provider/ accept what they say as authority (4)
6. To make decisions (5)
7. Be a partner (3)

Care providers were asked what they saw their role as providers to be. Providers were initially asked to provide their formal role (job description) and account of their actual roles. Through analysis the researchers determined that providers had difficulty distinguishing between the two different questions, so the answers were combined into one category. From their responses 75 open codes were created and reduced to seven code families:

1. Sharing information (14)
2. Provide emotional support (12)
3. Relationship building (10)
4. Be educated (9)
5. Providing physical support (8)
6. Ensure good outcomes (5)
7. Ensure safety (5)

Code families for patients and providers were compared to identify similarities and variances.

DISSCUSION

Patient role

There were many overlaps in what providers and patients expected from patients, however there was a large deal of variance in how patients and providers saw providers' roles (see Table 1). Some of the overlaps between patients' and providers' notions of a patient's role were: 1) to be a person advocate and take responsibility for their own role, 2) to communicate with the physician, 3) make decisions, 4) listen to provider accept what they say as authority, 5) to learn, and 6) be a partner.

Variances in how patients saw their role included: 1) don't totally rely on doctor, 2) be proactive ask questions, 3) be skeptical, 4) express needs, 5) be honest, 6) let doctors do their job/ don't get in the way, 7) passive/ be taken care of, 8) understand, and 9) to have good manners.

Some of these variance represented various perspectives patients had amongst themselves about what it meant to be a patient, for example some patients believed their role was to be extremely proactive and to manage the process and their care provider, while others believed it was their role to be passive and not to disrupt the doctors work and authority. This represents difference attitudes about patients' feelings of self-advocacy (*Wiltshire*, *Cronin*, *Sarto*, & *Brown*, 2006).

The only variance in physicians' perceptions of the patients' role was the code: to take care of themselves. Patients did not feel that it was their responsibility to take care of themselves.

Table 1: Patient's role

Patient	**Provider**
Don't totally rely on Doctor	
Be proactive	
Be personal advocate	Patient determines their own role
Ask questions	
Be skeptical	
Express needs	
Communicate with doctor	Tell doctor things
Be honest	
Let doctors do their job/ don't get in the way	
Passive/ be taken care of	
Make decisions	Make decisions
Do what doctor says	Listen to provider accept what they say as authority
Do independent research	Learn
Understand	
Work together	Be a partner
Manners	
	To take care of themselves

*Shading indicates overlap

Provider role

There was a larger amount of variance in perceptions of the physicians' role in the care proving process (see Table 2). The overlapping

codes included: 1) sharing information and 2) ensuring good outcomes. variances in patients ideas of physicians role were disclosing risk, 3) communicate, 4) be open minded, 5) invite patients to participate, 6) role= consultant, manager, shift roles, 7) provide best care, 8) personal attention, 9) be flexible, 10) explain things, 11) listen, and 12) keep mom / baby healthy.

Variances in physicians' notion of their role included: 1) a lifecycle of care, 2) be educated, 3) ensure safety, 4) relationship building, 5) provide emotional support, and 6) provide physical support.

Table 2: Provider's Role

Patient	**Provider**
Telling problems	Sharing information
Disclosing risk	
Communicate	
Be open minded	
Invite patients to participate	
Role= consultant	
Role= manager	
Role= shift roles	
Provide best care	
Personal attention	
Be flexible	
Explain things	
Listen	
Good outcomes	Ensure good outcomes
Keep mom / baby healthy	
	A lifecycle of care
	Be educated
	Ensure safety
	Relationship building
	Provide emotional support
	Provide physical support

*Shading indicates overlap

CONCLUSION

Variance analysis proved to be a useful tool for interpreting disconnects in perceptions and expectations in the care proving process. The results show that while patients and providers have agreement in their notions of the patient's role in the care providing process, there are mismatches in notions of the physician's role. These disconnects could have implications for situational awareness and performance. Limitations of this study included a relatively small group of participants and a limited scope; all participants were from a single obstetric work system, in a single region. However, the findings from this study show that variance analysis can be used in future studies with larger samples. Future studies should also examine the variance between patients and physicians in other work systems, to explore the presence of disconnects in other populations. A more detailed analysis, results and discussion will be reported in upcoming journal publications.

Acknowledgements

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