

THE ASSOCIATION BETWEEN INTERDISCIPLINARY TEAM DEVELOPMENT
AND PATIENT LENGTH OF STAY

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ABSTRACT

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There are very few studies in the literature that have examined the outcomes of healthcare interdisciplinary teams. Most existing studies have measured attributes of healthcare teams, however, none have implemented and examined outcomes of a team development intervention. This study was conducted to determine whether a development intervention employed with an existing interdisciplinary team would reduce the length of stay for patients in an acute care setting. A quasi-experimental single-subject time series design was conducted with multiple measures of length of stay collected across Baseline, Intervention, and Reversal phases of the study.

Bronstein's Model for Interdisciplinary collaboration provided the framework for this study. The components of this model were used to guide a team development intervention comprised of four consecutive weeks of classroom development sessions and four consecutive weeks of booster messaging. Length of stay (LOS) data was collected for each of the study phases to examine preintervention LOS and compare this data to LOS during the intervention and reversal phases.

The results of this study revealed that the interdisciplinary team development intervention had no positive impact on the length of stay data. Baseline mean LOS across 12 baseline months was 4.83 days (SD =.65) with monthly means ranging from 4.1 to 6.3 days. The mean LOS was 5.1 and 4.6 days respectively for intervention months of May and June and 6.0, 6.5, 5.7, and 5.4 days for the reversal months of July through October. All means in the intervention and reversal phases were higher than comparable months in the baseline phase. The pattern of the graphed trend was closely aligned with the seasonal variations seen during the baseline months.

While these results showed that the team development intervention provided for this interdisciplinary team had no positive effect on the LOS, there are a number of factors which may have influenced the results and may provide insights useful for future research. Length of stay may not be the outcome variable that reflects team effectiveness for this population. It is possible that the interdisciplinary team in this study had well developed collaborative processes prior to the intervention. Finally, physicians were not included in the team development intervention yet may be the discipline whose participation may have affected length of stay.

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CHAPTER I

INTRODUCTION

In 2001, the Institute of Medicine (IOM) released its second report addressing problems in America's health care system. This report focused on strategies for redesign of health care organizations. One of the recommendations made by the IOM was that health care organizations develop effective teams to reduce the problems of redundancy and fragmentation in the delivery of patient care (Briere, 2001). However, despite the shift towards interdisciplinary teams as an imperative for efficient and effective care, research to support the effectiveness of teams in improving outcomes of care is lacking.

A review of the literature on healthcare teams revealed a number of limitations among studies that have been conducted. Much of team literature centers on the antecedents of teamwork such as the functional dimensions of teams, composition of teams, and values such as respect and trust as well as team effectiveness indicators including performance outcomes, attitudinal outcomes and behavioral outcomes (Bronstein, 2003; Hall & Weaver, 2001; Cohen & Bailey, 1997). In many of these studies, self reported measures of team functioning were reported using tools that were not valid or reliable. In other studies, a theoretical framework was not considered resulting in methodological problems in the study design. A significant limitation has been the failure of healthcare researchers to include what has been learned from organizational studies into their research designs (Lemieux-Charles & McGuire, 2006).

The interdisciplinary healthcare team model may provide the healthcare organization with a means to optimize the delivery of patient care. However, there are significant transaction costs associated with the use of this model that may not be sustainable in an environment which is becoming increasingly cost conscious. If we are to continue with this model, we need research which supports the use of interdisciplinary teams as a means to optimize patient care.

Problem of Study

Bronstein's Model for Interdisciplinary Collaboration informs us that there are interpersonal processes that make up collaboration and influences that facilitate collaboration. Interdisciplinary teams that have been assigned to work together form a "naturally occurring" team whose members may not be prepared to work collaboratively. These interdisciplinary teams are at risk for team failure resulting in lost opportunities to optimize the outcomes to be attained by the team. The components of Bronstein's Model for Interdisciplinary Collaboration provides a framework for a team development intervention to prepare a team to work together and support the premise that the interdisciplinary team model is effective in improving patient care outcomes.

Rationale for Study

In the traditional patient care delivery model, the physician largely determines the participation of other disciplines and the extent to which their contributions are acknowledged (Hall & Weaver, 2001). Multiple team members work in parallel and engage in little interaction with other disciplines providing care for the same patient

(Slatin, Galizzi, Melillo, & Mawn, 2004). This model of care has been criticized for its fragmented, conflicted approach to patient care, and general inefficiency (Massey, 2001).

Interdisciplinary healthcare team members work synergistically with each discipline augmenting the contributions of others closely to attain a set of patient care goals (Hall & Weaver, 2001). For these teams to be successful, team members must overcome the boundary barriers of their respective disciplines and work together as a team.

Professional prerogatives and role emphasis need to be replaced with collaborative processes whereby each discipline contributes their skills and knowledge to devise a plan that is greater than the sum of its parts.

Research on the efficacy of health care teams in optimizing healthcare, such as through reducing length of stay, has been inconsistent. Published studies have failed to provide an operational definition of the interdisciplinary team membership or describe processes used by the team which would add to our understanding of factors contributing to positive outcomes. Interdisciplinary healthcare team research which is based on a conceptual model that explains the structure and processes of teams is needed.

For this reason a study was conducted on one outcome attained by a team who were prepared to work together as a team through an intervention designed to develop the team's use of collaborative processes.

Theoretical Framework

Bronstein's (2003) Model for Interdisciplinary Collaboration provides a framework for studying the effectiveness of interdisciplinary healthcare teams. Bronstein's two part

model includes five interpersonal processes that constitute interdisciplinary collaboration and factors that influence these processes (Bronstein, 2003). The processes that comprise interdisciplinary collaboration include interdependence, newly created professional activities, flexibility, collective ownership of goals, and reflection on process. Influences on interdisciplinary collaboration that facilitate or serve as barriers to collaboration include professional role, structural characteristics, personal characteristics, and the individual's history of collaboration (Bronstein, 2003).

Assumptions

The following theoretical assumptions were made:

1. Achieving positive patient outcomes is the goal of healthcare delivery systems.
2. The interdisciplinary team model is a patient care delivery model designed to deliver more positive patient care outcomes.

Research Question

This study used Bronstein's Model for Interdisciplinary Collaboration to guide a team development intervention and then examine an objective outcome of value to a healthcare organization. The following research question guided this study: Will patients who are cared for by an interdisciplinary team and who receive an intervention on team collaborative processes experience a shorter length of acute care stay as compared to patients who are cared for by the same interdisciplinary team before the intervention?

Definition of Terms

The following terms were defined for the purposes of this study:

1. Interdisciplinary team- a group of health care providers caring for a group of common patients consisting of a nurse and at least two other healthcare professionals from different disciplines.
2. Intervention on team collaborative process- a four hour workshop that focuses on team collaboration followed by four weekly booster interventions sent electronically to all members of the team.
3. Length of stay- the mean number of days of care on the study unit, derived from the midnight census, for an aggregate of patients cared for during a specified month

Limitations

1. The educational sessions that comprised the team development intervention were provided by the researcher.
2. Measurements after the intervention were limited to four months.

Summary

The remaining chapters in this dissertation present two manuscripts and a brief summary of the study. Chapter two is a published manuscript that outlines the rationale for interdisciplinary healthcare teams and presents a conceptual model and a review of the research literature on teams and healthcare teams. Chapter three is a manuscript that has been accepted for publication in *Critical Care Nursing Clinics* in April 2010. It provides a complete report of the research study including a description of the research

design and methodology, analysis and research findings with discussion, implications, and recommendations derived from the findings. Chapter four presents a summary of the research study.

CHAPTER II

LITERATURE REVIEW

This chapter contains a manuscript published in *Critical Care Nursing Quarterly*, Volume 32 (2), 2009. The article presents an overview of the rationale for interdisciplinary healthcare teams and explores the research done to date on healthcare teams. It also examines the theoretical framework used to support the intervention tested in this study and illustrates the connection between the framework and the intervention.

Reducing the Failure Risk of Interdisciplinary Healthcare Teams

The complexity of knowledge and skills required to care for today's healthcare problems have led to increased specialization and disciplinarity among health care providers. This shift acknowledges the complexity of human health and provides for an in-depth examination of problems; however, new challenges have been created by a health care delivery system comprised of multiple providers from different disciplines. One of these challenges is that specialized disciplines, bound to their discipline authorization, vocabulary, and approach to problem solving have what Petrie (1976) refers to as a "cognitive map" which becomes entrenched over time making communication with other disciplines more difficult. A discipline's cognitive map includes aspects such as basic concepts, modes of inquiry and observational categories. Different observational categories, particularly when there is little overlap of cognitive maps, can result in two disciplines seeing completely different things. Petrie contends

that interdisciplinary participants need to share these maps as a necessary condition for interdisciplinary work (Petrie, 1976).

The Premise for Interdisciplinary Healthcare Teams

The interdisciplinary collaboration model has become the health care delivery model (Briere, 2001; Halm, Gagner, Goering, Sabo, Smith, and Zaccagnini, 2003). The premise is that teams will provide a more integrated care delivery system maximizing potential outcomes of care. However, teams must overcome the boundary barriers of their respective disciplines to reach a level of mutual understanding and readiness to respond to the needs of patients. Hall and Weaver (2001) conceptualize healthcare teams as groups of different professionals functioning along a “continuum of degrees of interaction” (p. 868) representing multidisciplinary, interdisciplinary, and transdisciplinary teams. Multidisciplinary team members work in parallel with each discipline bringing their respective expertise to the group (Slatin, Galizzi, Melillo, and Mawn, 2004). There is little need for one participant to be aware of the other’s work (Petrie, 1976). In traditional settings, the physician prescribes the contribution of other disciplines and communication is through the physician in charge (Hall and Weaver, 2001). Massey (2001) contended that multidisciplinary teams often result in “fragmented, incomplete assessments, conflicting priorities and strategies, lack of systematic and holistic approach and inefficient, expensive outcome attainment” (p.86).

Interdisciplinary team members on the other hand work closely, communicate frequently and come together to solve a common set of problems (Hall and Weaver, 2001). Team members use their discipline specific skill and knowledge to augment the

contributions of others (Hall and Weaver, 2001). Some degree of interaction is required, including modification of the disciplinary sub contributions based on the contributions of other disciplines (Petrie, 1976). As teams move along the interaction continuum, the need for mutual interaction increases.

Transdisciplinary team members have roles which are more “blurred.” Team members are capable of assuming portions of work which are traditionally performed by another discipline. At this end of the continuum, team members overlap roles and have greater understanding of the concepts of another discipline (Hall and Weaver, 2001).

Political Forces and Healthcare Responses

In 1998, the PEW Health Professions Commission released its fourth report, which included an analysis of changes in the health care system, identification of trends that will impact practice, recommendations for all health professional groups, and 21 competencies essential for all health care professionals. One of the PEW Health Professions Commission’s key recommendations was that all health professionals be required to develop interdisciplinary competence (O’Neil and PEW Health Professions Commission, 1998). Towards this end, the commission recommended that medical and professional schools revise curricula to include preparation for interdisciplinary competence. In support of the 21 competencies, the National League for Nursing Accrediting Commission (NLNAC) includes “[functioning] in new health care team settings and interdisciplinary team arrangements” (NLNAC, 2004, p.85) as a core competency for educational programs.

In a 2001 Institute of Medicine (IOM) report, one of the six recommended aims is that health care organizations develop effective teams to reduce the problem of suboptimization of health care processes (Briere, 2001).” Suboptimization results when there is little cooperation and teamwork leaving patients to suffer through lost continuity, redundancy, excess cost, and miscommunication” (Briere, 2001, p.83). Professional prerogatives and emphasis on role delineation becomes the priority over promoting the total system’s functioning thus improving care delivery processes (Briere, 2001).

What Do We Really Know About Interdisciplinary Healthcare Teams

A criticism of research on interdisciplinary healthcare teams is the failure of healthcare researchers to incorporate findings from organizational studies into their study designs (Lemieux-Charles and McGuire, 2006). Cohen and Bailey’s (1997) review of the organizational research on teams provided a summary of team studies conducted between 1990 and 1996. The studies reviewed by Cohen and Bailey (1997) found group size to have inconsistent effects on team outcomes. Autonomy of the team was positively associated with the attitudinal outcome of job satisfaction and trust for management, mixed for the behavioral outcome turnover and absenteeism, and positively associated with performance outcome both self-rated and manager-rated. Rewards were not consistently found to be directly related to team effectiveness; other mediating variables seemed to influence whether or not rewards are a predictor of effectiveness. Supervision was also not found to be positively correlated with team effectiveness; however, supervisor mood and setting of high standards positively affected team effectiveness.

Group cohesiveness was found to be positively related to the team performance (Cohen and Bailey, 1997).

Petrie (1976) observed the processes used by interdisciplinary groups to identify factors influencing interdisciplinary inquiry, idea dominance, psychological considerations, and the institutional setting. Idea dominance is the focus or achievement to be obtained by the group. Psychological characteristics of successful team members included, disciplinary competence, broad interests, a sense of achievement, and tolerance for the unknown. The institutional setting refers to the administrative and social support given to the group. Petrie suggested that disciplines must also learn some of other disciplines cognitive map if they are to work in an integrated manner. The minimal amount of another discipline's cognitive map Petrie (1976) suggested must be learned includes observational categories and the meanings of key terms. These suggestions provide elements which can be included as part of a team development intervention to increase a team's effectiveness.

Rentsch and Klimoski (2001) conducted a study in a naturalistic setting to examine the relationship between antecedents of team member schema agreement and team effectiveness. Schema agreement, the interconnected knowledge of a team in the dimensions of content and or structure, was derived from interviews with members of the teams studied and correlated with variables theorized to influence schema agreement and team effectiveness factors. High team member schema agreement was positively correlated with small team size, previous experience as a team member, recruitment into team membership as the mode of becoming a team member, education similarity, and

organizational level. A positive correlation also existed between team member teamwork schema agreement and an overall team effectiveness score. This research suggests that homogeneity of team members is an antecedent of team effectiveness and non homogeneity of interdisciplinary teams may predispose these teams to be ineffective if not addressed.

Gilson, Mathieu, Shalley, and Ruddy (2005) examined the antithetical paradigms of work standardization and creativity as determinants of team effectiveness for the measures of performance and customer satisfaction. Creativity within teams was positively associated with higher levels of performance while standardization was positively associated with greater customer satisfaction. These researchers suggested that organizations need to strike a balance between team use of creative processes and practices that detail how work is to be done. These suggestions provide elements which can be included as part of a team development program to increase a team's effectiveness.

Lemieux-Charles and McGuire's (2006) contended that existing research on the effectiveness of interdisciplinary teams is inconclusive partly due to the failure of researchers to conceptualize interdisciplinary teams as well as other methodological problems conducting team research (1997). In addition, the reviewers also criticized researchers for poorly conceptualizing outcome measures and the use of invalid tools. Lemieux-Charles and McGuire (2006) reviewed intervention studies comparing team care to usual care. Geriatric patient populations in acute or home care settings were more often the study population and outcome measures were largely objective measures of

team effectiveness. Lemieux-Charles and McGuire (2006) concluded that these studies provided some evidence that team care resulted in better patient care outcomes as well as improved patient satisfaction. However, the few studies in different settings made it impossible to make generalizations about the effectiveness of team care (Lemieux-Charles and McGuire, 2006). In addition, Lemieux-Charles and McGuire (2006) found that while outcomes for studies were positive in certain settings; in other setting the same outcome may have been negative. Differences in settings, types of teams, and types of populations studied made it impossible to generalize and draw conclusions on the effect of task redesign (Lemieux-Charles and McGuire, 2006). In their review of field studies where relationships between team effectiveness variables and outcomes were examined, disciplinaryity was found to have a significant impact on objective and subjective measures of team effectiveness. Team size was found to have a positive effect on effectiveness up to a certain point, beyond that point, team size had a negative effect.

Schofield and Amodeo (1999) conducted a review of literature to evaluate the effectiveness of the interdisciplinary team use as a sustainable mode of patient care delivery. One hundred and thirty eight articles on the benefits, drawbacks, and outcomes of interdisciplinary teams were retrieved. No studies on the cost of the interdisciplinary healthcare team model, institutional supports needed for successful teams or healthcare redesign role were identified. Schofield and Amodeo found that the lack of a consistent operational definition for the terms multidisciplinary and interdisciplinary was problematic resulting in fewer relevant studies that met the search criteria.

Schofield and Amodeo's (1999) review of 55 articles they categorized as descriptive, found these publications to be largely anecdotal. Fifty-one articles categorized as process-focused also were more anecdotal than scientific. Twenty-one of the articles reviewed included research or quantitative methods to study interdisciplinary teams. Approximately two thirds of these articles focused on interdisciplinary team functioning. Schofield and Amodeo viewed these empirical articles as exemplary of the methodological problems associated with conducting research on interdisciplinary healthcare teams. Methodological problems such as lack of operational definitions for research variables and lack of a conceptual model of interdisciplinary teamwork were discussed.

San Martin-Rodriguez, Beaulieu, D'Amour, and Ferrada-Videla (2005) reviewed studies published between 1980 to 2003 on determinants influencing the development and consolidation of collaboration within interprofessional teams. Variables which positively influenced collaboration were identified within the categories of systemic factors, organizational factors, and interactional factors (San Martin-Rodriguez, Beaulieu, D'Amour, and Ferrada-Videla, 2005). Systemic determinants of positive collaboration include a social system which favors equality of power, cultural values which do not run counter to the spirit of collaboration, a professional system which focuses on a rationale for collaboration and the recognition of interdependence as opposed to professional territory, and an educational system which helps students develop professional plurality. Organizational determinants of positive collaboration include decentralized, flexible horizontal organizational structures, administrative support to convey a collaborative

vision and motivate others toward collaboration, team resources including time and work space for collaboration, and coordination and communication mechanisms. Interactional determinants of positive collaboration include voluntary willingness of team members to collaborate, trust in self and others, open and active communication which is effective and efficient, and mutual respect of other team members.

Leipzig, Hyer, Kirsten, Wallenstein, Vezina, Fairchild, et. al (2002) surveyed the attitudes of nurse practitioners, social workers, and second year residents toward working on interdisciplinary healthcare teams. All team members felt interdisciplinary teams were a productive use of time with benefits for the patient, however, physicians maintained the position that they should be the team leader and should have the final word in patient care plans. The study suggests that all members of the interdisciplinary healthcare team may not have the skills needed to participate effectively in teamwork.

Cashman, Reidy, Cody, and Lemay (2004) conducted a longitudinal study of the effect of team development on the functioning of an interdisciplinary team of healthcare providers working in a primary care setting. The System for the Multiple Level Observations of Groups was used to assess the team's functioning before the start of team development workshops and on two subsequent time points over the course of 26 months. Group members moved toward characteristics of an effective team by the second assessment, however, the group digressed to a less effective state by the third assessment. While this study supported the premise that team effectiveness can be improved through a development intervention, limitations exist in the application of these findings. The extended length of the development intervention did not provide for turnover of team

members and other organizational changes that may influence team development. In addition, the disciplinarity of this team was not as heterogeneous as may be seen in acute care settings as compared to a primary care setting.

Curley, McEachern, and Speroff (1998) conducted the only randomized controlled study located in this literature search. The authors studied outcomes of interdisciplinary rounds conducted by health care teams from six disciplines. Patients cared for by interdisciplinary rounds had significantly shorter lengths of stay and decreased total charges compared to patients cared for by traditional rounds. Statistical analysis of provider satisfaction surveys completed by 19 members of the traditional rounds group and 21 members of the interdisciplinary rounds group revealed significantly greater understanding of patient care, more effective communication, and more teamwork for the interdisciplinary groups.

Wheelan, Burchill, and Tilin (2003) conducted a descriptive study to examine the relationship between group functioning level of teams and the standardized mortality ratio (SMR) for intensive care units. Participants in the study totaled 394 health care workers from 17 ICUs in nine east coast hospitals. Team members included nurses, physicians, clerical staff and unlicensed assistive personnel. The group functioning level was self identified by team member's completion of the Group Development Questionnaire. Studies in other industries have shown that groups with higher levels of development are more productive and effective than groups at lower stages of development. These researchers aimed to determine if findings would be similar in healthcare settings. The measure of outcome used by the researchers was the unit's

actual compared to predicted mortality rate, derived from Acute Physiology and Chronic Health Evaluation (APACHE) III Mortality Prediction scores, used to calculate a standard mortality ratio (SMR). A SMR lower than one indicated that the actual mortality rate was lower than predicted and a SMR greater than one indicated that the actual mortality rate was greater than predicted. The researchers found that as the team's perception of their development level increased, the unit's SMR decreased. The researchers concluded that a link between teamwork and patient's outcomes was established by their results and that healthcare organizations should invest in team development.

Alexander, Lichtenstein, Jinnett, Wells, Zazzali, and Liu (2005) conducted a longitudinal study of 40 cross-functional psychiatric treatment teams in Veteran's Administration facilities across the nation. Individual team members were surveyed using instruments to measure team participation and team functioning. Measures of team participation were positively correlated with measures of patient functional status while measures of team functioning did not correlate with functional status. This study supported the existence of differentiating factors in team processes that may affect patient outcomes, although the distinction the researchers made between team participation and team functioning was not clear.

Mudge, Laracy, Richter, and Denaro (2006) conducted a controlled trial on the outcomes attained by multidisciplinary team of providers caring for patients on a medical inpatient unit. The intervention group demonstrated improved outcomes as defined by greater access to allied health services, reduced decline in activities of daily living, fewer

deaths during hospitalization, improved post discharge self-rated health change, and a greater number of patients admitted from residential care returning to residential care. Although the study authors believed these findings were generalizable to other settings, the description of the team processes was limited.

If we are to proceed with investments in development of interdisciplinary teams, restructure education of healthcare professionals to include interdisciplinary team skills, and justify the resource utilization of interdisciplinary teams, additional interdisciplinary healthcare team research is needed. Evidence to support the potential outcomes to be achieved by interdisciplinary healthcare teams remains sparse and existing studies have problematic designs. This evidence can be gained through research designed using a conceptual model which explains on the outcomes achieved by a team of disciplines. Without compelling evidence, the health care system may not be willing to invest in team development and interdisciplinary teams may fade as a passing endeavor

Fostering Successful Interdisciplinary Healthcare Teams

Bronstein's (2003) Model for Interdisciplinary Collaboration provides a framework for designing a team development program to foster a successful interdisciplinary health care team and inform healthcare leaders on support systems needed by teams. Bronstein's two part model, derived from multidisciplinary theory of collaboration, services integration, role theory, and ecological systems theory, includes processes that constitute interdisciplinary collaboration and barriers or aids that influence these processes (Bronstein, 2003). Bronstein (2003) identified five interpersonal processes that make up interdisciplinary collaboration; interdependence, newly created professional activities,

flexibility, collective ownership of goals, and reflection on process. Interdependence requires integrative teamwork whereby group members rely on reciprocity and communication that spans professional boundaries to merge expertise and maximize creativity (Bronstein, 2003). Newly created professional activities are new durable structures that reflect unique purposes that result when groups create something together that members would not have been able to create independently (Bronstein, 2003). Flexibility refers to the adaptability required of team members to respond productively to the needs of the situation through deliberate role-blurring. Collective ownership of goals refers to all members of a team sharing in defining realistic goals and taking concerted action to attain reach those goals. Reflection on process refers to team investment in their working relationships and processes through feedback, self-evaluation, and efforts to strengthen their collaborative relationships (Bronstein, 2003).

Influences on interdisciplinary collaboration are the part of Bronstein's model that explains what facilitates or serves as barriers to collaboration. The presence of these components contributes to collaboration, whereas the absence of these components serves as barriers. These influences include; professional role, structural characteristics, personal characteristics, and the individual's history of collaboration. (Bronstein, 2003). The professional role refers to the alliance to the profession within which the team member has been socialized and the capacity to understand another professional's socialization within a situation that requires allegiance to both ones own profession and the interdisciplinary team (Bronstein, 2003). Structural characteristics refer to administrative support for interdisciplinary collaboration through provision or resources for the

collaboration to occur (Bronstein, 2003). Personal characteristics include the individual attributes of team members which includes characteristics of trust, respect, understanding, informal communication between collaborators, and comfort with each others personal behavior (Bronstein, 2003). A history of collaboration, particularly positive collaboration is an influence on successful collaboration among team members (Bronstein, 2003).

A team training workshop derived from Bronstein's model would provide a means to facilitate development of a shared cognitive map among team members and in turn potentially reduce the risk of team failure. This training program can be created by organizational training specialists who provide these services or adapted from an existing program. One example of an existing program is SOFTSKILLS COURSEWARE Team Building: Developing High Performance Teams ©, a well researched team building course (SOFTSKILLS COURSEWARE, 2006). This is an adaptable program available for purchase which includes modules that are consistent with components of Bronstein's Model. Table 1 provides an example of a workshop series integrating SOFTSKILLS COURSEWARE Team Building: Developing High Performance Teams with Bronstein's Model.

Table 1

Connection of Bronstein's Model to Team Training Workshop

Model concept	Team training workshop topics
Influences on collaboration; Professional role Structural characteristics Personal characteristics History of collaboration	<p>Members making up study interdisciplinary team will attend four one hour workshop adapted from: <i>Team Building: Developing high performance teams</i> by SOFTSKILLS COURSEWARE©</p> <p>Session 1 <i>Team Player Survey</i>© <i>Objective: Provide team members opportunity to learn more about individual team members and their professional roles.</i></p>
Interpersonal processes; Interdependence	<p><i>Objective: Facilitate team member interdependence and capacity to synergistically interact with others.</i></p> <p><i>Obsolescence of Hierarchy</i>© <i>Objective: Promote inclusiveness and respect for all members' contributions.</i></p>
Newly created professional activities and flexibility	<p>Session 2 <i>Freedom for Creative Thinking</i>© <i>Objective: Prepare team members to broaden thinking and expand scope beyond traditional roles.</i></p>
Collective ownership of goals	<p>Session 3 <i>Team Problem-Solving</i>© <i>Objective: Assist team members to develop problem-solving and goal setting skills</i></p>
Reflection on process	<p>Session 4 <i>Assessing Team Projects</i>© <i>Objective: Assist team member's participation in self-evaluation and ongoing improvement as a team.</i></p>

Conclusion

Regardless of the lack of evidence to support interdisciplinary healthcare teams as the means to optimize care, given the ongoing challenges created by the complexities of healthcare, it is likely that interdisciplinary healthcare teams will continue as the new healthcare delivery model. Until adequate research is conducted to evaluate the outcomes of interdisciplinary teams, one solution is to incorporate what is known about teams through organizational studies into healthcare settings. To assume that “naturally occurring” healthcare teams, teams that have informally evolved over time as patient care needs have changed, will be effective or provide an adequate variable for study is erroneous empirical thinking. Interdisciplinary healthcare teams require team development as do all successful teams. Interdisciplinary healthcare teams require an operational definition as do all research variables.

CHAPTER III

RESULTS

This chapter contains a manuscript of an article that has been accepted for publication in *Critical Care Nursing Clinics* in April 2010. This article provides a complete description of the research study design, describes the methodology and analysis employed and presents the findings with a discussion of results and implications and recommendations for future research.

Defragmenting Care: Testing an Intervention to Increase The Effectiveness of Interdisciplinary Healthcare Teams

Introduction

In 2001, the Institute of Medicine (IOM) recommended that health care organizations deemphasize professional prerogatives and role delineation through development of effective teams to reduce the healthcare system's problems of lost continuity, redundancy, excess cost and miscommunication in patient care delivery (Briere, 2001). However, despite the forward momentum to provide interdisciplinary care, the premise that an interdisciplinary team model will provide a more integrated care delivery system therefore maximizing potential outcomes of care, has not been adequately supported by research. While we have some understanding of factors contributing to positive outcomes, we still do not know what it is that successful healthcare interdisciplinary teams do together or how they function. Given the

complexity of today's healthcare environment, research priorities are needed which provide meaningful direction to organizations attempting to respond to recommendations such as those set forth by the IOM.

Existing research on the effectiveness of interdisciplinary teams has been largely inconclusive. This is due in part to a failure of researchers to clearly define the concept of interdisciplinary healthcare teams (Lemieux-Charles and McGuire, 2006) or to conduct studies which support the clinical or cost effectiveness of teams (Schofield and Amodeo, 1999). Many interdisciplinary healthcare team studies have been studies on "naturally occurring" teams; teams that have informally evolved over time as patient care delivery models have shifted towards interdisciplinary teams. While many studies have described the disciplinary of the team, none have described the processes used by the team. There has also been a lack of research that elucidates a structured theory based intervention that serves to develop the processes or connect the team processes to an outcome measure of effectiveness. The context within which teams are embedded has not been adequately considered. For example, environmental factors within healthcare settings create unique situational influences on the processes of interdisciplinary healthcare teams. Finally, there is a failure of healthcare researchers to incorporate findings from organizational studies into their study designs (Lemieux-Charles, & McGuire, 2006).

A few recent research studies have provided a foundation on which to build new research. These studies have supported the relationship between group functioning level,

collaboration and a qualitative or quantitative outcome attained by an interdisciplinary healthcare team (Wheelan, Burchill, & Tilin, 2003; Alexander, Lichtenstein, Jinnett, Wells, Zazzali, & Liu, 2005; Strasser, Falconer, Herrin, Bowen, Stevens, & Uomoto, 2005), as well as the effect of a team development intervention on the functioning of an interdisciplinary team (Cashman, Reidy, & Lemay, 2004). Other studies support the premise that teams may need a development intervention to increase their collaborative capacity (Leipzig, Hyer, Kirsten, Wallenstein, Vezina, Fairchild, et. al, 2002) and that team care may reduce length of stay among an acute care medical population of patients (Curley, McEachern, & Speroff, 1998).

Wheelan, Burchill, and Tilin (2003) conducted a descriptive study to examine the relationship between group functioning level of teams and the standardized mortality ratio (SMR) for intensive care units. Participants in the study totaled 394 health care workers from 17 ICUs in nine east cost hospitals. Team members included nurses, physicians, clerical staff and unlicensed assistive personnel. The group functioning level was self identified by team member's completion of the Group Development Questionnaire (GDQ). Four scales corresponding to four stages of progressive group development comprised the 60 item tool. The measure of outcome used by the researchers was the unit's actual compared to predicted mortality rate, derived from Acute Physiology and Chronic Health Evaluation (APACHE) III Mortality Prediction scores, used to calculate a standard mortality ratio (SMR). The researchers found that as the team's perception of their development level increased, the unit's SMR decreased.

In a large multi-institutional study, Alexander, Lichtenstein, Jinnett, Wells, Zazzali, and Liu (2005) examined 40 cross-functional psychiatric treatment teams in Veteran's Administration facilities across the nation. Individual team members were surveyed using instruments to measure team participation and team functioning. Participation was defined as contributions made to the team efforts and team functioning was defined as perception of team coordination, cohesion, and performance. Results indicated that team participation was positively related with patient functional status while team functioning did not significantly correlate with functional status.

In another large scale study in the Veteran's Administration system, Strasser, et.al (2005) evaluated the relationship between attributes of rehabilitation teams and key outcome measures for stroke patients. Forty –six inpatient rehabilitation teams and 1678 stroke patients were included. Ten attributes of team functionality were self-reported by six core disciplines comprising each of the rehabilitation teams. Functional improvement was significantly correlated with teams that reported more structure, greater use of quality information and lower task orientation.

Cashman, Reidy, Cody, and Lemay (2004) conducted a study to examine the effects of team development training sessions on the functioning of an interdisciplinary team in a primary care setting. Team members were provided a series of five training and development workshops that extended over a 24 month period. The System for the Multiple Level Observations of Groups (SMLOG) was used to assess the team's functioning before the start of the development workshops and on two subsequent time points over the course of 26 months. Group members moved toward characteristics of an

effective team by the second assessment, however, the group digressed to a less effective state by the third assessment.

Leipzig, Hyer, Kirsten, Wallenstein, Vezina, Fairchild, et. al (2002) surveyed the attitudes of nurse practitioners, social workers, and second year residents toward working on interdisciplinary healthcare teams. Baseline data was collected over a 30 month period for 26 academic institutions participating in Geriatrics Interdisciplinary Team Training (GITT) program nationwide. All team members felt interdisciplinary teams were a productive use of time with benefits for the patient, however, physicians maintained the position that they should be the team leader and should have final decision making in planning patient care.

In the lone randomized controlled trial, Curley, McEachern, and Speroff (1998) examined the effects of interdisciplinary rounds versus traditional rounds. Upon admission, 1102 patients were randomly assigned to one of six inpatient medical teams comprised of members from six disciplines. Three teams provided interdisciplinary rounds while the remaining three provided traditional rounds. Patients cared for by teams using interdisciplinary rounds had significantly shorter lengths of stay. Provider satisfaction surveys revealed significantly greater understanding of patient care, more effective communication, and more teamwork for those members of the interdisciplinary groups.

In order to address the benefits of interdisciplinary teams to patient care or the health care system, interdisciplinary healthcare team research which is based on a conceptual model that explains the structure and processes of teams is needed. If we are to proceed

with investments in interdisciplinary teams; we need evidence that interdisciplinary teams are effective in achieving desirable outcomes. As a result, this study was designed and conducted using Bronstein's collaborative model (2003) to guide an interdisciplinary healthcare team development intervention then to examine length of stay (LOS) (an objective outcome of team care); and asked the following research question: Will patients who are cared for by an interdisciplinary team and who receive an intervention on team collaborative process experience a shorter length of acute care stay as compared to patients who are cared for by the same interdisciplinary team before the intervention?

Bronstein's (2003) Model for Interdisciplinary Collaboration provided the framework for studying the development and training of an interdisciplinary team and the influence of that team on a specified outcome of mean length of stay on one acute care medicine unit. There are five interpersonal processes and four influencing factors that comprise Bronstein's model and explain interdisciplinary collaboration (figure 1).

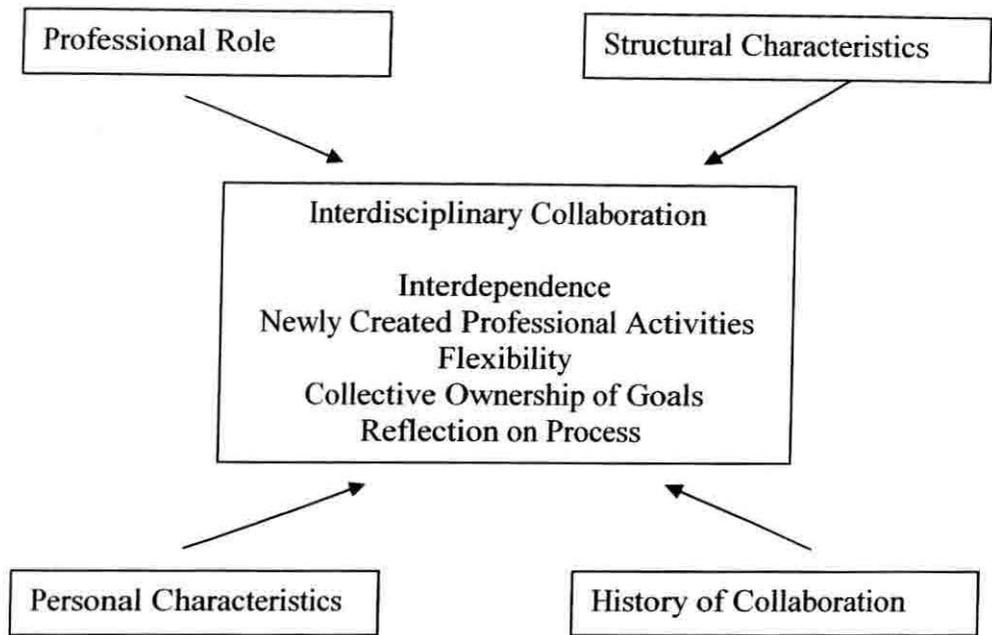


Figure 1. Components of and influences on interdisciplinary collaboration.

The five interprofessional processes form the core components of the model and include: interdependence newly created professional activities, flexibility, collective ownership of goals, and reflection on process. Interdisciplinary collaboration is influenced by four factors: professional role, structural characteristics, personal characteristics, and the history of collaboration (Bronstein, 2003). These factors can either facilitate or serve as barriers to collaboration among disciplines. It is through these five processes and four influences that interdisciplinary collaboration occurs and outcomes of team collaboration are achieved (Bronstein, 2003). A fuller explanation of the model can be found in Bronstein's article located in *Social Work* Vol 48 number 3, 2003.

Methods

This research study used a quasi experimental single-subject time series design with three distinct phases: baseline, intervention, and reversal. During the Baseline Phase, serial length of stay data was retrospectively collected for twelve months. Monthly measures were selected to coincide with normal monthly length of stay data reporting time periods of the study setting. The purpose of a retrospective analysis was to establish the preintervention length of stay and to determine if there were any spikes or dips in length of stay that might reflect seasonal variations and interfere with the interpretation of the study findings. Length of stay data was also collected for the two months in which the intervention was administered and for four months following the intervention.

The following definitions were used for purposes of this research:

1. Interdisciplinary team- a group of health care providers caring for a group of common patients consisting of a nurse and at least two other healthcare professionals from different disciplines.
2. Intervention on team collaborative process- a four hour workshop that focuses on team collaboration followed by four weekly booster interventions sent electronically to all members of the team.
3. Length of Stay- the mean number of days of care on the study unit, derived from the midnight census, for an aggregate of patients cared for during a specified month.

During the Intervention Phase, a fifty minute weekly team development intervention was provided for four consecutive weeks for members of the study unit's existing interdisciplinary team. Team development focused on members of the team who were most likely to interact during the dayshift hours. Interdisciplinary team members who attended the intervention included a social worker, case worker, staff nurses, and unlicensed nursing staff.

The intervention provided for the interdisciplinary team by the researcher was developed using an adapted version of SOFTSKILLS COURSEWARE Team Building: Developing High Performance Teams, a well researched team building course (SOFTSKILLS COURSEWARE, 2006). The essential components of Bronstein's model were used as components of the team development training workshops. Members of the interdisciplinary team participated in learning experiences designed to develop their interpersonal process skills with other members of the team. Activities and content selected for the four sessions of the workshop and four booster interventions reflected all five interpersonal processes which make up Bronstein's components of collaboration.

The team development training was provided at the same time and day of the week for each of the four weeks. The team development intervention was followed by four weeks of booster interventions consisting of electronic messages designed to reinforce the team development concepts provided in the workshop and intensify the effect of the team development intervention on the length of stay variable. Members of the interdisciplinary team consistently attended the training with the exception of the nursing staff whose attendance was more variable in accordance with their work schedules. None

of the participants requested to discontinue participation in the workshops or electronic messages.

The setting was an acute care medicine unit of a large metropolitan hospital. The team development interventions were provided in a classroom located convenient to the unit. Booster interventions were provided through an institutional electronic messaging system. All unidentified patients cared for in the general medicine acute care unit who were normally counted in the hospital's length of stay aggregate database for mean length of stay reports comprised the sample. During the Intervention and Reversal Phases of this study, the admission criteria for patients admitted to this unit remained the same as during the Baseline Phase. Permission to conduct the study was obtained from the Institutional Review Board of the study setting and the Texas Woman's University.

Length of stay data for the Baseline Phase was collected with the assistance of the data administrator for the study institution. During the Intervention and Reversal Phases, length of stay data was obtained from the aggregate quality reports routinely prepared and disseminated by the data administrator for the hospital. Mean length of stay was recorded, plotted, and examined for trends for the baseline, intervention, and reversal months of care. Since this was a single subject design using aggregate means lengths of stay, individual patient demographic data were not collected for this study.

Results

Twelve months of the study unit's historical length of stay data was reviewed before beginning the intervention with the team. Baseline months started in May 2008 and continued through April 2009. Baseline data is described in detail in table 2. The mean

length of stay across the 12 months was 4.83 days (SD = .65). Means across the 12 months ranged from 4.1 to 6.3 days. The highest LOS mean, reported for the month of March, was greater than two standard deviations above the mean average. The lowest LOS means, reported for the months of July, November and December, were one standard deviation below the mean average. To reduce the effects of seasonal variability, the Intervention and Reversal Phases of this study were conducted during the months which were within one standard deviation of the mean LOS for the Baseline Phase.

Table 2

LOS Means for May 2008 through April 2009

Month	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Total
Baseline LOS Means	4.6	4.5	4.2	4.7	4.8	4.6	4.1	4.1	5.4	5.4	6.3	5.2	4.83 (.65)
Intervention LOS Means	5.2	4.6											
Reversal LOS Means			6.0	6.5	5.7	5.4							

The length of stay for the intervention and reversal months were graphed and examined for trends against baseline months (Figure 2). When viewing the overall pattern between the baseline and intervention/reversal phases, it is apparent that all LOS for the intervention and reversal months are higher than the comparable months at baseline (Figure 2). The LOS during the intervention months of May and June shows a downward trend similar to the LOS during the comparable baseline months. While the LOS of the intervention months were higher when compared to baseline months, the similar

downward trends appear to be normal seasonal variations rather than an intervention effect.

As in the case of the Intervention Phase, the LOS for the Reversal Phase were graphically similar to the comparable months of the Baseline Phase. The LOS of baseline months August and September increased above the LOS for May and June. The LOS of reversal months August and September also increased above preceding months of May and June. Examining the graph between phases, the LOS during the reversal months did not show a downward trend when compared to the intervention months. Additionally, the LOS of the intervention months was not sustained during the reversal months, but rather reverted to similar seasonal variations seen during the baseline months.

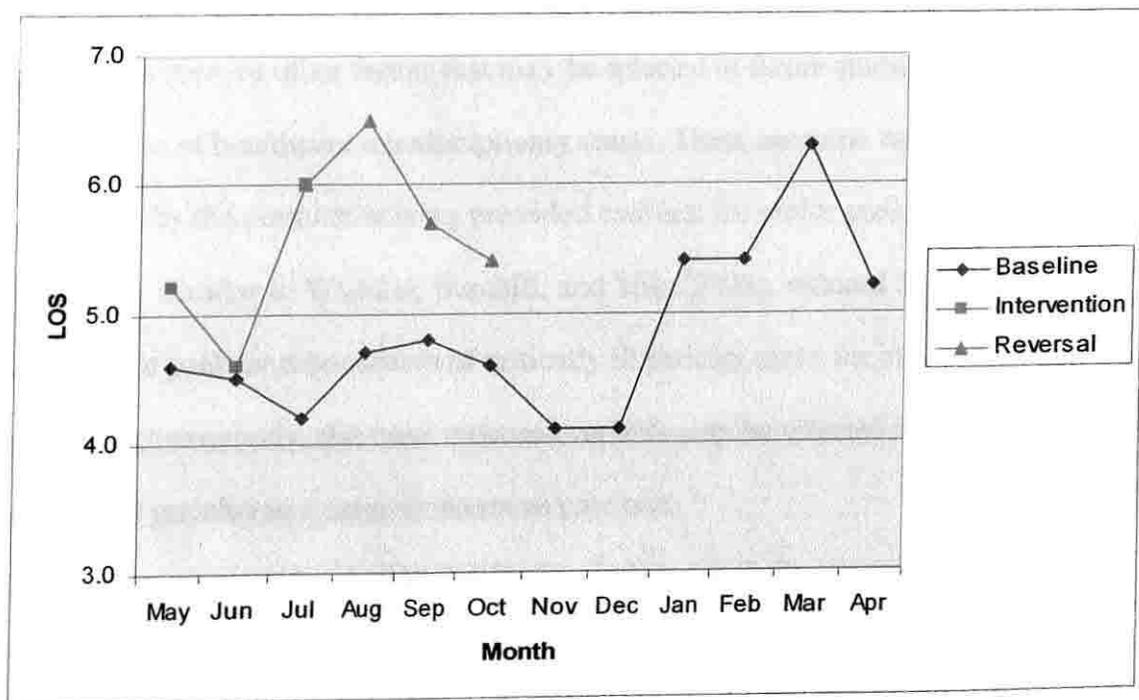


Figure 2. LOS for Baseline, Intervention, and Reversal Phases

Discussion

The results of this study showed that the team development intervention provided for this interdisciplinary team had no positive effect on the LOS. Although the length of stay during the Intervention Phase did show a slight decrease from the immediate preceding months, examination of the data did not show a continuing trend toward reduced length of stay. There are a number of factors which may have influenced the results of this study.

While Length of stay was selected as the outcome variable for this study as it has been in other interdisciplinary team studies (Curley, McEachern, and Speroff, 1998; and Strasser, Falconer, Herrin, Bowen, Stevens, and Uomoto, 2005), other variables might serve as better measures of optimization of care processes by the interdisciplinary team. There are numerous other factors that may be selected in future studies to reflect the effectiveness of healthcare interdisciplinary teams. These outcome variables may be determined by the population being provided care and the major goals of care for that population. Similar to Wheelan, Burchill, and Tilin (2003), reduced SMR may be selected as a goal for a population of critically ill patients cared for in a medical intensive care unit. Alternatively, this same outcome variable may be selected for a population of critically ill patients in a surgical intensive care unit.

Previous research has included differing patient populations including an inpatient medical unit (Curley, McEachern, & Speroff, 1998). It is possible that there is less margin for reduction in length of stay within this general medicine group than for other populations. Length of stay may be a metric of team effectiveness for an interdisciplinary

team caring for another population of patients with diverse health problems or another level of acuity. Complex patient populations who have undergone specialty surgical procedures such as organ transplantation requiring extensive coordination of care may show reduced LOS following a team development intervention.

Interdisciplinary team rounding was underway on the study unit prior to the intervention phase. It is possible that the interdisciplinary team had already developed collaborative processes prior to the intervention. According to Bronstein's Model (Bronstein, 2003), previous history with collaboration affects the individual's interdisciplinary collaboration. This interdisciplinary team was a "naturally occurring" team whose members were assigned to the unit based on other factors which were not identified. Individual team members were not surveyed for their prior experience as a member of a team. Before and after team effectiveness assessments using a tool such as Cashman, Reidy, Cody, and Lemay's (2004) use of SMLOG may have shown that this team was already highly effective and already optimized length of stay as an outcome for study.

Within acute care settings, physicians are providers who interact with interdisciplinary teams directly or indirectly. In an early study by Baggs, Ryan, Phelps, Richeson, and Johnson (1992) as well as a study conducted twenty years later (Leipzig, Hyer, Kirsten, Wallenstein, Vezina, Fairchild, et. al, 2002), physician's perception of collaboration and the use of authority have been suggested as variables that may affect team processes. Within this team membership, physicians may have been the missing

discipline whose participation may have benefited the team therefore effecting collaboration and length of stay.

Consistent attendance at the team development intervention sessions was problematic for members of the nursing discipline all of whom worked variable compressed schedules. While alteration of times may have improved the participation of nursing staff, other disciplines would not have been accommodated. An additional factor is that interdisciplinary team rounding occurred on the day shift. This creates an argument that perhaps only day shift members of nursing staff needed to participate in the team development training, however, the success of the nurses' contribution was contingent on shift to shift communication. However nurses interface with the team, competence as a member of an interdisciplinary team remains an essential skill for all professional nurses.

The results of this study indicated that LOS was not positively affected by use of a team development intervention. However, this study may serve to provide researchers with insights which may be useful for future research. The following are recommended:

1. Identify desirable outcomes to be measured by an interdisciplinary healthcare team which are derived from the common goals of the team.
2. Include physicians as members of the interdisciplinary healthcare team participating in a team development intervention.
3. Assess interdisciplinary healthcare teams using a tool that measures team effectiveness and provide team development for teams not demonstrating developed collaborative processes.

4. Select patient populations with different healthcare problems and different levels of acuity to evaluate a team development intervention on length of stay.

Regardless of the scarcity of well designed studies to support interdisciplinary healthcare teams as the means to optimize care, the use of healthcare teams continues to be the new healthcare delivery model. Studies comparing interdisciplinary team care to the traditional model may no longer be feasible since the team model has largely replaced the traditional model in acute care settings. Given the transaction costs of team care, efforts are needed to identify teams which may be fragmented in their approach to care and are in need of support if they are to be effective. Furthermore, the approach to increase a team's effectiveness needs to be guided by what is known about team collaborative processes. Team development programs may provide the support needed by some teams to lessen fragmentation of care and the associated increased cost, errors, and inefficiencies. Efforts continue to be needed to identify and define meaningful and measurable outcomes to be achieved by teams. Future research studies on outcomes achieved by teams who have received team development may provide the needed evidence that this model of care is effective in achieving desirable patient outcomes.

CHAPTER IV

SUMMARY

This research study contributed to the literature on interdisciplinary healthcare teams through submission of two manuscripts for publication. The first published manuscript provided a review of the current research on interdisciplinary healthcare teams. The second manuscript accepted for publication provided a comprehensive overview of the completed research study. Together these manuscripts demonstrate how previous research can provide a foundation on which to build a new study guided by a theoretical framework.

The purpose of this quasi experimental single-subject time series study was to examine the effect of a team development intervention in reducing the length of stay for patients cared for in an acute care setting. Evidence was needed to support the premise that the interdisciplinary model of healthcare delivery is effective in improving patient care outcomes. A few recent research studies provided a foundation on which to build this study. These studies supported the relationship between group processes and outcomes as well as the effect of a team development intervention on the functioning level of an interdisciplinary team of healthcare providers.

Bronstein's model for Interdisciplinary Collaboration (2003) provided a framework for integrating previous research and designing a team development intervention. An existing interdisciplinary team comprised of a social worker, case worker, staff nurses,

and unlicensed nursing staff participated in an eight week team development intervention provided by the researcher. Team members participated in a weekly team development training sessions for four consecutive weeks which were followed by a weekly booster electronic message for four weeks. The content of the intervention was derived from concepts reflected in Bronstein's model (2003). Length of stay data was collected for 12 months before the intervention, during the two months of the intervention, and for four reversal months after the intervention. The length of stay for the intervention and reversal months were graphed and examined for trends against baseline months.

Summary of the Findings

The results of this study showed that the team development intervention provided for this interdisciplinary team had no positive effect on the LOS. All the means during or after the intervention were higher than comparable means prior to the implementation of the intervention and trended similarly to the seasonal variations seen during the comparable baseline months. There were a number of factors identified which may have influenced the results of this study. The interdisciplinary team was a formed team who may have already developed collaborative processes and maximally reduced the LOS among this population. It is also possible that there was no further margin to reduce the LOS in this particular population of patients experiencing general medical health problems. Since physicians were not included in the team development intervention, the LOS effect of this discipline's collaboration was unknown. These factors provide insight which may be useful for future research. These include the need to identify desirable and measurable outcomes to be attained by an interdisciplinary team, include other

disciplines, particularly physicians, in a team development intervention, and assess interdisciplinary teams using a tool that measures collaboration to assess whether or not a team intervention is needed. This same study may also be conducted with a team caring for a population of patient populations experience other health problems or populations experiencing a higher level of acuity.

REFERENCES

- Alexander, J.A., Lichtenstein, R., Jinnett, K., Wells, R., Zazzali, J., & Liu, D. (2005). Cross-functional team processes and patient functional improvement. *Health Services Research*, 40, 1335-1355.
- Amundson, S.J. (2005). The impact of relational norms on the effectiveness of health and human service teams. *The Health Care Manager*, 24, 216-224.
- Baggs, J. G., Ryan, S. A., Phelps, C.E., Richeson, J.F., & Johnson, J.E. (1992). The association between interdisciplinary collaboration and patient outcomes in a medical intensive care unit. *Heart & Lung*, 21, 18-24.
- Briere, R. (Ed.). (2001). *Crossing the quality chasm: A new health system for the 21st century*. Washington D.C.: National Academy Press.
- Bronstein, L.R. (2003). A model for interdisciplinary collaboration. *Social Work*, 48, 297-306.
- Cashman, S.B., Reidy, P., Cody, K., & Lemay, C.A. (2004). Developing and measuring progress toward collaborative, integrated, interdisciplinary health care teams. *Journal of Interprofessional Care*, 18 (2), 183-196.
- Cohen, S. G., & Bailey, D.E. (1997). What makes teams work: Group effectiveness research from the shop floor to the executive suite. *Journal of Management*, 23, 239-290.

- Cole, K.D., Waite, M.S., & Nichols, L.O. (2003). Organizational structure, team process and future directions of interprofessional health care teams. *Gerontology Geriatric Education*, 24 (2), 35-49.
- Curley, C., McEachern J.E., & Speroff, T. (1998). A firm trial of interdisciplinary rounds on the inpatient medical wards: An intervention designed using continuous quality improvement. *Medical Care*, 36 (Suppl.8), AS4-AS12.
- Gilson, L., Mathieu, J.E., Shalley, C.E., & Ruddy, T.M. (2005). Creativity and Standardization: Complementary or conflicting drivers of team effectiveness. *Academy of Management Journal*, 2005, 48, 521-531.
- Hall, P. & Weaver, L. (2001). Interdisciplinary education and teamwork: A long and winding road. *Medical Education*, 35, 867-875.
- Halm, M.A., Gagner, S., Goering, M., Sabo, J., Smith, M., & Zaccagnini, M. (2003). Interdisciplinary Rounds: Impact on patients, families, and staff. *Clinical Nurse Specialist*, 17, 133-142.
- Henneman, E., Dracup, K., Ganz, R. Molayeme, O., & Cooper, C. (2001). Effective of a collaborative weaning plan on patient outcome in the critical care setting. *Critical Care Medicine*, 29, 297-303.
- Hyrkäs, K. & Appelqvist-Schmidlechner, K. (2003). Team supervision in multiprofessional teams: Team member's descriptions of the effects as highlighted by group interviews. *Journal of Clinical Nursing*, 12, 188-197.

- Lemieux-Charles, L., & McGuire, W. L. (2006). What do we know about health care team effectiveness? A review of the literature. *Medical Care Research and Review*, 63, 263-300.
- Leipzig, R.M., Hyer, K., Kirsten, E., Wallenstein, S., Vezina, M.L., Fairchild, S. et al. (2002). Attitudes toward working on interdisciplinary healthcare teams: A comparison by discipline. *Journal of American Geriatrics Society*, 50, 1141-1148.
- Massey, C. (2001). A transdisciplinary model for curricular revision. *NLN Nursing and Health Care Perspectives*, 22 (2), 85-88.
- McClelland, M, & Sands, R.G. (1993). The missing voice in interdisciplinary communication. *Qualitative Health Research*, 3, 74-90.
- Mickan, S. M., & Rodger, S.A. (2005). Effective health care teams: A model of six characteristics developed from shared perceptions. *Journal of Interprofessional Care*, 19, 358-370.
- Mudge, A., Laracy, S., Richter, K., & Denaro, C. (2006). Controlled trial of multidisciplinary care teams for acutely ill medical inpatients: Enhanced multidisciplinary care. *Internal Medicine Journal*, 36, 558-563.
- National League for Nursing Accrediting Commission (2004). *NLNAC Accreditation manual with interpretive guidelines by program type*. New York: National League for Nursing Accrediting Commission, Inc.

- O'Neil, E. H., & the PEW Health Professions Commission. (1998). *Recreating health professional practice for a new century*. San Francisco, CA: PEW Health Professionals Commission, December
- Parker-Oliver, D., Bronstein, L.R., & Kurzejeski, L. (2005). Examining variables related to successful collaboration on the hospice team. *Health & Social Work, 30*, 279-286.
- Pethybridge, J. (2004). How team working influences discharge planning from hospital: a study of four multi-disciplinary teams in an acute hospital in England. *Journal of Interprofessional Care, 18*, 29-41.
- Petrie, H.G. (1976). Do you see what I see? The epistemology of interdisciplinary inquiry. *Journal of Aesthetic Education, 10*, 29-43.
- Poulton, B. C., & West, M.A. (1999). The determinants of effectiveness in primary health care teams. *Journal of Interprofessional Care, 13*, 7-18.
- Rentsch, J.R. & Klimoski, R.J. (2001). Why do "great minds" think alike? Antecedents of team member schema agreement. *Journal of Organizational Behavior, 22*, 107-120.
- San Martin-Rodriguez, L., Beaulieu, M., D'Amour, D., & Ferrada-Videla, M. (2005). The determinants of successful collaboration: A review of theoretical and empirical studies. *Journal of Interprofessional Care, 19* (Suppl.1), 132-147.
- Schofield, R.F. & Amodeo, M. (1999). Interdisciplinary teams in health care and human services settings: Are they effective? *Health and Social Work, 24*, 210-219.

- Sherer, R., Stieglitz, K., Narra, J., Jasek, J., Green, L., Moore, B., et al. (2002). HIV multidisciplinary teams work: Support services improve access to and retention in HIV primary care: *AIDS Care*, 14 (Suppl. 1), S31-S44.
- Slatin, C., Galizzi, M., Melillo, K.D, & Mawn, B. (2004). Conducting interdisciplinary research to promote health and safe employment in health care: Promises and pitfalls. *Public Health Reports*, 119 (January-February), 60-71.
- Strasser, D.C., Falconer, J.A., Herrin, J. S., Bowen, S.E., Stevens, A.B., & Uomoto, J. (2005). Team functioning and patient outcomes in stroke rehabilitation. *Archives of Physical Medicine and Rehabilitation*, 86,403-409.
- Velsoft Interactive, Inc. SOFTSKILLS COURSEWARE. (2004-2006). *Team Building: Developing high performance teams*. Retrieved November 8, 2006 from <http://www.softskillscourseware.com/teambuilding.html>
- Vinokur-Kaplan, D. (1995). Enhancing the effectiveness of interdisciplinary mental health treatment teams. *Administration and Policy in Mental Health*, 22, 521-530.
- Weiss, E., Anderson, R.M., & Lasker, R.D. (2002). Making the most of collaboration: Exploring the relationship between partnership synergy and partnership functioning. *Health Education & Behavior*, 29, 683-698.
- Wheelan, S.A., Burchill, C.N., & Tilin, F. (2003). The link between teamwork and patient's outcomes in intensive care units. *American Journal of Critical Care*, 12, 527-534.

APPENDIX A

Human Subjects Review Committee Permission to Conduct Study

and

Agency Permission to Conduct Study



The Committee for the Protection of Human Subjects
Office of Research Support Committees

9410 Fannin, Suite 1100
Houston, TX 77030

Dr. Rachel Kilgore

NOTICE OF CONTINUING REVIEW APPROVAL

March 17, 2009

HSC-MH-07-0540 - *The Association Between Interdisciplinary Team Development and Patient Length of Stay in an Inpatient Medical Unit*

PI: Rachel Kilgore

PROVISIONS: Unless otherwise noted, this approval relates to the research to be conducted under the above referenced title and/or to any associated materials considered at this meeting, e.g. study documents, informed consents, etc.

NOTE: If this study meets the federal registration requirements and this is an investigator-initiated study, or if the PI is the study sponsor or holds the IND/IDE applicable to this study, and no one else has registered this trial on the national registry, you are required to register this trial on the national registry at www.clinicaltrials.gov in order to publish results in any of the key peer-reviewed journals. For further information contact Gena Monroe at 713-500-7903.

APPROVED: By Expedited Review and Approval

REVIEW DATE: March 16, 2009

APPROVAL DATE: March 17, 2009

EXPIRATION DATE: 02/28/2010

CHAIRPERSON: Anne Dougherty, M.D.

Upon review, the CPHS finds that this research is being conducted in accord with its guidelines and with the methods agreed upon by the principal investigator (PI) and approved by the Committee. This approval, subject to any listed provisions and contingent upon compliance with the following stipulations, will expire as noted above:

CHANGES: The PI must receive approval from the CPHS before initiating any changes, including those required by the sponsor, which would affect human subjects, e.g. changes in methods or procedures, numbers or kinds of human subjects, or revisions to the informed consent document or procedures. The addition of co-investigators must also receive approval from the CPHS. ALL PROTOCOL REVISIONS MUST BE SUBMITTED TO THE SPONSOR OF THE RESEARCH.

INFORMED CONSENT: Informed consent must be obtained by the PI or designee(s), using the format and procedures approved by the CPHS. The PI is responsible to instruct the designee in the methods approved by the CPHS for the consent process. The individual obtaining informed



January 10, 2008

MEMORIAL HERMANN HEALTHCARE SYSTEM

Thank you for choosing Memorial Hermann as your service provider for this research study. Please remember to acknowledge the Memorial Hermann - Texas Medical Center in any publications resulting from this study, and provide a copy of the publication to the Executive Director of the Memorial Hermann Clinical Innovation & Research Institute (cheryl.chanaud@memorialhermann.org). Thank you.

UT IRB NUMBER: HSC-MS-07-0540 PRINCIPAL INVESTIGATOR: Rachel Kilgore, RN, MS
STUDY TITLE: The Association Between Interdisciplinary Team Development and Patient Length of Stay in an Inpatient Medical Unit
DATE OF UT IRB APPROVAL: December 14, 2007
NUMBER OF SUBJECTS: 29

Approval is hereby granted by Memorial Hermann Healthcare System to initiate this research study involving the Hospital's patients, staff or facilities.

Please sign and return a copy of this letter to the Memorial Hermann Clinical Innovation & Research Institute, c/o Memorial Hermann Hospital, Mailbox 90, via FAX (713) 704-5124, or scanned .pdf file to bridget.solis@memorialhermann.org to indicate your acceptance of our terms and policies (guidelines attached). This study cannot be initiated until the letter is signed and returned to the Memorial Hermann Clinical Innovation & Research Institute. If you have questions or need additional information, please contact the Memorial Hermann Clinical Innovation & Research Institute at (713) 704-4226.

APPROVED:

ACCEPTANCE:

Handwritten signature of Linda M. Braun, PhD, dated 01/11/2008, on behalf of Cheryl H. Chanaud, Ph.D., Executive Director of Memorial Hermann Research.

Handwritten signature of Rachel Kilgore, dated 1/11/08, Principal Investigator.

The following MH Departments have provided approval - DISTRIBUTION (with copies of the (IRB) approval letter, IRB Exempt from HIPAA Authorization, and MH Guidelines)

- Tammy Campos - Director, Medicine
Brenda Lyon - Chief Nursing Officer
Renee Miles - AVP, Medicine
Nikki Pollard - Corporate Human Resources



Office of Research
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April 22, 2009

Ms. Rachel Kilgore
College of Nursing - R. Langford Faculty Adv
6700 Fannin Street
Houston, TX 77030

Dear Ms. Kilgore:

Re: *"The association between interdisciplinary team development and patient length of stay in an inpatient medical unit"*

The above referenced study has been reviewed by the TWU Institutional Review Board (IRB) and was determined to be exempt from further review.

Any changes in the study must receive review and approval prior to implementation unless the change is necessary for the safety of subjects. In addition, you must inform the IRB of adverse events encountered during the study or of any new and significant information that may impact a research participant's safety or willingness to continue in your study.

Sincerely,

Dr. John Radcliffe, Chair
Institutional Review Board - Houston

APPENDIX B

Protocol for Data Collection

Protocol for Data Collection

Baseline Phase

1. Record as data collection start time for Baseline Phase
2. Access data management system for aggregate data; length of stay
3. Obtain 12 months of retrospective length of stay data.
4. Plot data and examine for stability

Intervention Phase

1. Record as data collection start time for Baseline Phase
2. Team members will attend four fifty minute weekly team development sessions.
3. Team members will receive four weekly development boosters.
4. Record date and time as data collection start time for Intervention Phase
5. Access data management system for aggregate data; length of stay
6. Plot data and examine for trends for total of two months

Reversal Phase

1. All intervention will cease
2. Record date and time as data collection start time for Reversal Phase
3. Access data management system for aggregate data; length of stay
4. Plot data and examine for trends for total of four months

End of Data Collection

APPENDIX C

Protocol for Team Workshop Intervention

And

Team Booster Interventions

Protocol for Team Workshop Intervention

Workshop Preparation

1. Meet with scheduler for unit nursing staff and determine best dates and times for dayshift unit RN staff to attend team development workshop.
2. Meet with disciplines assigned to the unit to provide patient care. Determine best dates and times for all to attend team development workshop.
3. Combine information from steps 1 and 2 to create team development workshop schedule. Create roster and send information to participants, scheduler, and participant's supervisor.
4. Reserve room within the facility for workshop presentations. Request loan of equipment for power point presentation. Send workshop materials to print shop for copying and binding.

Workshop Delivery

1. Sign in all staff arriving to the workshop and provide bound copy of course materials. Obtain work email address and usual work hours of all attendees during sign in.
2. Present content for Session 1 in 50 minutes.
3. Present content for Sessions 2, 3, 4 each week for four consecutive weeks.

Protocol for Team Booster Interventions

Week 1 Booster Intervention

1. Prepare to send electronic message one week after last team development workshop.
2. Send to interdisciplinary team distribution list
3. Copy and paste preprepared electronic message into the body of the email:

Cooperation: How is your cooperating operating?

Week 2 Booster Intervention

1. Prepare to send electronic message one week after first booster message.
2. Repeat step 2 of Week 1 booster intervention.
3. Copy and paste preprepared electronic message into the body of the email:

Creative Thinking: Which thinking hat are you using?

Week 3 Booster Intervention

1. Prepare to send electronic message one week after second message.
2. Follow step 2 of above weeks
3. Copy and paste preprepared electronic message into the body of the email:

Team Problem-Solving: Diverge then converge (No lone rangers)

Week 4 Booster Intervention

1. Prepare to send electronic message one week after third message
2. Follow step 2 of above weeks
3. Copy and paste preprepared electronic message into the body of the email:

Assessing Team Projects: Reflection and Revision

APPENDIX D

Team Development Curriculum

TORI Model of Team Building

- Trust
- Openness
- Realization
- Interdependence

Beckhart's Group Activities

- Setting goals and priorities
- Analyze work processes
- Examine the way team is working
- Examine team agreement, conflict, and relating

Tuckman and Jensen's Stages

- Forming
- Storming
- Norming
- Performing

Parker's Twelve Characteristics of Effective Teams

- Clear Purpose
- Informality
- Participation
- Listening
- Civil Disagreements
- Consensus Decisions
- Open Communication
- Clear Roles and Work Assignments
- Shared Leadership
- External Relations
- Style Diversity
- Self-Assessment
- Completion of Team Parker Team Survey
- Discussion of Parker Survey Results

DeBono's Six Thinking Hats

- White Hat Thinking-facts and figures
- Red Hat Thinking-emotions and feelings
- Black Hat Thinking-negative assessment
- Yellow Hat Thinking-positive and constructive
- Green Hat Thinking-creative
- Blue Hat Thinking-controls and organizes

APPENDIX E
Memo to Participants

To: Fellow coworkers attending Model of Care Interdisciplinary Team Training
From: Rachel V. Kilgore, MS, RN
RE: Optional Training
Date:

Thank you for attending today's session on the Model of Care and Interdisciplinary Team Training. The Interdisciplinary Team Training component of this class has been designed to prepare you to fulfill your job duties as an employee of Memorial Hermann Hospital by working as a member of an interdisciplinary team.

In addition to serving as your interdisciplinary team trainer, as part of my course of study for a doctorate degree in nursing, I personally am conducting a research study on the outcomes achieved by trained interdisciplinary teams. My study includes the usual team training program you are to receive as an interdisciplinary team member as well as additional follow up email messages from me. Following this training, you will receive four weekly email messages from me. There is no required email response or further action on your part. My hope is that you will open and read the email message.

While your employer has requested that you attend today's training, you are not obligated to receive the four follow up emails from me. If you do not wish to receive these emails from me, please let me know. Your decision to not receive emails from me will not affect your training in any way. You will not receive any additional contact from me after the team training has been completed. If after receiving an email from me, you decide you do not want to receive any further emails, you are not obligated to continue to receive additional email messages.

Please inform me if you do not want to receive emails from me. I will be available to you at the end of today's class, through email at rachel.kilgore@memorialhermann.org or through telephone at (713) 704-5687.

Thank you very much.

APPENDIX F

Length of Stay Data Collection Form

Length of Stay Data Collection Form

Phase	Check One	Capture Date Interval (Circle One)	Mean LOS
Baseline		1 2 3 4 5 6 7 8 9 10 11 12	
Intervention		1 2 3 4 5 6 7 8	
Reversal		1 2 3 4	

APPENDIX G

Manuscript Acceptance

Kilgore, Rachel

From: Hartner, Katie (ELS-PHI) [K.Hartner@Elsevier.com] **Sent:** Fri 9/25/2009 1:14 PM
To: Kilgore, Rachel
Cc: DEBORATX@aol.com
Subject: Critical Care Nursing Clinics
Attachments: [MS_guidelines_2008.doc\(228KB\)](#)

September 25, 2009

Rachel Kilgore

Rachel.Kilgore@memorialhermann.org

Dear Dr. Kilgore:

I was delighted to learn from Debora Simmons, RN, MSN, CCRN, CCNS, that you have agreed to prepare an article, "Defragmenting care: An intervention to increase the effectiveness of interdisciplinary healthcare teams," for the issue of *Critical Care Nursing Clinics* devoted to Safety.

Enclosed please find a set of guidelines for your use in preparing the manuscript. It is essential that the email address of the corresponding author is included on the title page. Page proof and reprints are sent to the corresponding author's email address. Please be sure that *each* author's full name, degrees, affiliations, mailing address, and daytime phone number appear on the article's front page. The manuscript should be approximately 12-20 typed double-spaced pages in length (depending on the topic as some lend themselves to shorter or longer articles), including references. Please follow reference style carefully.

Instructions for submitting illustrations are provided in the enclosed guidelines, also available online at www.elsevier.com. It is the responsibility of any *Clinics* author to obtain permission for use of reprinted illustrations, tables, or other material copyrighted by others; you can submit copies of any correspondence regarding permission with your manuscript or send it directly to me. Procedures for obtaining permission are included in the guidelines. Contact me if you have questions.

Of great importance in periodical publishing is the deadline for submission of manuscripts, which is December 1, 2009. Because the *Clinics* are run on a tight production schedule, we cannot guarantee publication of late manuscripts; therefore, please make every effort to mail your article to Dr. Simmons on time. The initial draft should be sent, via email, to Dr. Simmons for review and comments.

You will receive corrections/queries from our production team through an electronic proof. Here you will have the opportunity to make minor changes prior to publication.

Upon publication, each contributor will receive a copy of the printed issue, provided that a street address has been supplied. Each corresponding author will receive a PDF file of his/her article for his/her personal communication and not for resale, and not to be posted on the internet (Elsevier policy is that the final published version of the article as it appears in the issue will continue to be available only on an Elsevier site).

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<<MS_guidelines_2008.doc>>

<https://webmail.mhhs.org/exchange/Rachel.Kilgore@memorialhermann.org/Inbox/Critical...> 9/26/2009

Once again, thank you for participating in this issue; I look forward to working with you. Please feel free to contact me if you have any questions.

Sincerely,



Katie Hartner

Editor, *Clinics in Laboratory Medicine*

Tel: (215) 239-6111

Fax: (215) 239-6114

K.Hartner@mhhs.org

<https://webmail.mhhs.org/exchange/Rachel.Kilgore@memorialhermann.org/Inbox/Critical...> 9/26/2009