

A THEORY-DRIVEN APPROACH TO EVALUATING A COMMUNICATION INTERVENTION

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Abstract: Evaluating interventions in the practice setting calls for an alternative approach to the traditional randomized controlled trial (RCT), as its feasibility and generalizability, and clinical utility of its results are being questioned. The theory-driven approach (TDA) to evaluation, as an alternative to the RCT, attempts to account for the realities of practice. The TDA specifies the causal processes underlying the intervention effects, and identifies its expected outcomes as well as factors that affect treatment processes, such as patient, intervener, and setting characteristics. In this article, the TDA to intervention evaluation is presented as a means of designing and conducting evaluation. The TDA is discussed at the conceptual level and illustrated with examples from a pilot study that examined the effectiveness of a communication enhancement intervention designed to improve the communication skills of nursing staff in a complex continuing care (CCC) facility.

Résumé: L'évaluation des interventions dans les cadres d'exercice exige une approche modifiée à l'égard des études sur échantillon aléatoire et contrôlé (RCT) traditionnelles puisqu'elle remet en question la faisabilité et le caractère généralisable, ainsi que l'utilité clinique des résultats. En ce qui concerne l'évaluation, l'approche axée sur la théorie (TDA), comme solution de rechange à la RCT, tente de tenir compte des réalités de la pratique. La TDA précise les processus causaux qui sous-tendent les effets de l'intervention et énonce ses effets escomptés, ainsi que les facteurs

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qui affectent les processus de traitement tels que les caractéristiques des patients, des intervenants, et du cadre. Dans cet article, la TDA est présentée comme un moyen pour concevoir et réaliser des évaluations. Elle est abordée du point de vue conceptuel et illustrée à l'aide d'exemples tirés d'une étude pilote qui examinait l'efficacité d'une intervention visant à améliorer la communication et conçue pour rehausser les compétences en communication du personnel infirmier dans un établissement de soins continus complexes.

The experimental or randomized controlled trial (RCT) is considered the most appropriate design to evaluate interventions or programs (Shadish, Cook, & Campbell, 2002). Although the RCT provides an overall assessment of whether or not a program worked, some of its features may actually limit the generalizability or external validity and clinical utility of the results. For example, in RCTs the intervention is delivered under well-controlled conditions to clients who were selected based on strict exclusion and inclusion criteria. A carefully selected sample is unlikely to be representative of all subgroups of the target population encountered in everyday practice. Moreover, the practice conditions under which the intervention is ultimately implemented include many factors that cannot be controlled but which may nevertheless affect the delivery of an intervention and the achievement of its intended outcomes. If the influence of these factors is not addressed during an evaluation study, then the evaluator may conclude that the intervention was not effective when in fact it may have been (type 2 error). Knowledge on exactly which factors influenced the delivery of an intervention and achievement of its outcomes can be used to improve the design of the evaluation study and subsequent interpretation of the results (Lipsey, 1997). Addressing the influence of these factors calls for an alternative approach to intervention evaluation.

In this article, we describe and illustrate the theory-driven approach (TDA) as an alternative approach for the design and evaluation of interventions in the practice setting. The ultimate goal of the article is to demonstrate the usefulness of the TDA in guiding the evaluator to identify potential extraneous factors that may influence outcome achievement in an intervention evaluation study. We first describe how previous RCT intervention research, in the area of communication between nursing staff and clients, may have led to a type 2 error. We describe the TDA and compare it to the RCT. We briefly discuss the strengths and limitations of the TDA in intervention evaluation. We then illustrate the application of the TDA using data obtained from a pilot study. The pilot study examined

the effectiveness of a communication enhancement program designed to improve the communication skills of nurses working in a long-term care setting. We conclude that the value of operationalizing the TDA is the identification of a conceptual framework that delineates extraneous influences on program implementation and achievement of the intended outcomes, and the use of the framework in designing and conducting the evaluation study.

COMMUNICATION PROGRAMS: PREVIOUS FINDINGS

The enhancement of nursing staffs' communication strategies has been identified as a priority for those working in long-term care (LTC) environments (Lubinski, 1995; Winchester, 2003). Patient satisfaction surveys have indicated that clients are more concerned about their communication with staff than about any other aspect of their experience (Brown, Boles, Mellooly, & Levinson, 1999). Communication training has been found to increase nurses' willingness and comfort in communicating with their clients (Bowles, Mackintosh, & Torn, 2001), reduce their use of elderspeak (i.e., terms of endearment), enhance their tone (Williams, Kemper, & Hummert, 2003), and reduce their levels of frustration (Bryan, Axelrod, Maxim, Bell, & Jordan, 2002). However, communication training has not been found to influence client satisfaction with care (Bowles et al.; Bryan et al.). Lack of clear, explicit frameworks to guide the design of communication interventions, limited attendance to extraneous factors, and the absence of intervention implementation checks may have contributed to the non-significant effects on client outcomes. In previous studies that evaluated the effectiveness of communication interventions, the influence that extraneous variables may have had on outcome achievement has not been examined empirically. Descriptive evidence suggests that client, staff, and setting characteristics may have influenced the effectiveness of the interventions under evaluation. For instance, it was reported that nurses are less likely to communicate with clients who are cognitively impaired (Armstrong-Esther & Browne, 1986; Armstrong-Esther, Browne, & McAfee, 1994), physically dependent (Allen & Turner, 1991), or have a speech impairment (Bryan et al.). These findings suggest that clients with these characteristics may not have actually received the communication intervention as designed or may have received an insufficient amount or dose of the intervention.

Similarly, preliminary evidence suggests that nurse characteristics such as job category may have influenced implementation of the in-

tervention when delivered by nurse interveners. Davies (1992) found that registered nurses (RNs) used proportionally more strategies to promote the dignity, self-respect, choice, and independence of their clients than did health care aides (HCAs). Caris-Verhallen, Kerkstra, Bensing, and Grypdonck (2000) reported that RNs used more task-focused communication styles compared to HCAs. Thomas (1994) found that HCAs spent more time in verbal interaction than RNs, which may have been attributed to the various duties assigned to these different categories of staff. Previous work by McGilton (2001) found that RNs were more comfortable communicating with clients who had concerns, as compared to HCAs. Winchester (2003) found that even though HCAs provide most of the direct care in LTC, they often do not know what to say or are afraid of saying the wrong thing; therefore, because of their discomfort, they say nothing.

Factors inherent in the setting in which the intervention was implemented, such as the care delivery model, have also been found to influence nurse-client communication. Thomas (1994) found nursing staff in primary care wards (i.e., where nurses are assigned to provide total care for their clients) spent more time communicating with clients than did nurses in the functional wards (i.e., different categories of staff provide different types of care to the same client).

Despite these findings suggesting that these extraneous factors may have influenced delivery of the intervention and subsequent achievement of the desired outcomes, their effects have not been systematically examined when evaluating the effectiveness of communication interventions. This is considered a significant limitation. By not examining the effects of extraneous variables on the implementation of the intervention and the relationship between the actual intervention implementation and the outcomes, the evaluator may have erroneously concluded the communication intervention to be ineffective (type 2 error). Therefore, we need to take into account various factors that may influence the intervention and achievement of its outcomes. Accounting for these factors decreases error variance, which in turn increases statistical power to detect significant intervention effects (Chen & Rossi, 1987). This can be accomplished by using the TDA when designing and evaluating clinical interventions.

THE THEORY-DRIVEN APPROACH

In this section, we describe how the TDA can be used to guide the evaluator in considering relevant variables that may influence the

delivery of an intervention and the achievement of the anticipated outcomes. We describe these variables under the elements of the input-process-outcome (Sidani & Sechrest, 1999). Lastly, we describe how the elements are organized into a framework that guides the evaluator in designing and conducting the intervention evaluation study.

The TDA is viewed as an approach for evaluating interventions implemented under the conditions of everyday practice. The TDA acknowledges and takes into consideration the complexity of the real world of practice where multiple factors interact to influence outcome achievement (Lipsey, 1993; Sidani & Sechrest, 1999). These factors encompass the characteristics of (a) the clients receiving the intervention, (b) the persons delivering the intervention (the interveners), and (c) the settings in which the intervention is delivered. In terms of the clients, while the RCT is concerned with the effectiveness of the intervention for the average client who meets the set of rigorous eligibility criteria, the TDA is concerned with its effectiveness for different client subgroups. Individuals may vary in their personal and health characteristics, their preferences for the intervention, and/or their ability to participate in the intervention. Empirical evidence suggests that nurses use different communication strategies with different clients because clients in long-term care facilities vary in their speaking abilities, secondary to strokes and dementia. For example, in a quasi-experimental study with 118 HCAs, Bryan and colleagues (2002) found that HCAs altered their communication patterns based on the client's speaking abilities. Specifically, staff were reluctant to communicate with and were not able to understand clients with communication impairments. This client characteristic influences how nurses implement the intervention, which in turn influences the client's achievement of its intended outcomes. In the TDA, this individual variation is of substantive interest to the evaluator. The influence of client characteristics on intervention delivery and outcome achievement is examined empirically for the purpose of determining the subgroups of clients who most benefit from the intervention (Sidani & Braden, 1998; Sidani, Epstein, & Moritz, 2003).

In terms of the persons delivering the intervention, in the RCT the researcher carefully selects the interveners to meet pre-specified professional characteristics and trains them to adhere strictly to the intervention protocol in order to ensure uniformity in delivery of the intervention. Alternatively, in the real world of practice, multi-

ple interveners vary in characteristics that may influence the delivery of the intervention and subsequent achievement of the outcomes. Therefore, the TDA advocates empirically examining the influence of intervener characteristics to determine who is best suited to implement the intervention. This is an important consideration since communication studies have identified specific intervener (i.e., nurse) characteristics, such as job category, as potentially influencing communication (Caris-Verhallen et al., 2000; Davies, 1992; Thomas, 1994). Given that nursing staff in LTC settings vary in these characteristics, it is important to incorporate their potential influences into the design of communication intervention evaluation studies.

In terms of the setting, the researcher in the RCT attempts to empirically control those factors in the environment that may influence the delivery of the intervention and achievement of the outcomes. However, this may not be feasible in the real world of practice. In the TDA, the evaluator acknowledges and integrates these factors into the design of the study and data analyses (Sidani & Braden, 1998). The purpose is to identify the conditions that facilitate implementation of the intervention (Lipsey, 1993).

The application of the TDA requires evaluators to (a) relax the selection criteria for entry into the study, (b) document variability in implementation of the intervention, and (c) account for variability in the characteristics of clients, interveners, and settings (Sidani et al., 2003). It calls for the evaluator to develop a framework that identifies and delineates the relationships amongst the factors that are believed to influence the delivery of the intervention and the achievement of its outcomes.

The framework can be derived from results of previous studies, observations of clinical practice, interviews with stakeholders, and relevant theories (Chen, 2003; Sidani & Braden, 1998). The framework identifies the variables of interest under the three elements: input, process, and outcome. Input incorporates the characteristics of the clients, the interveners, and the settings. Characteristics of the clients include personal resources needed to participate in the intervention as well as personal and health-related characteristics, such as level of speech impairment. Characteristics of the interveners include professional and personal attributes, such as the nurses' level of education required to effectively deliver the intervention. Characteristics of the setting include the physical, social, and cultural

aspects of the environment, such as organizational culture, and norms and policies.

Process incorporates the components and dosage of the intervention conceptualized as critical to, and necessary for, achievement of the anticipated outcomes (Lipsey, 1993). The components of the intervention refer to the subgroups of activities composing the intervention. For example, communication training interventions consist of three components: cognitive, behavioural, and psychological (Williams et al., 2003). Each component has its own specific goal and is given to address specific learning needs. Dosage refers to the amount, frequency, and duration of the intervention. The actual components and the actual dosages received, as opposed to those that were intended, are examined. Lastly, the processes mediating the effect(s) of the intervention on the outcome(s) are described and presented in a causal model of change (Chen, 2003; Lipsey, 1993). For example, based on previous communication training programs for nursing staff (Williams et al., 2003), we knew that all three components were required to effect a change in nurses' communication strategies when interacting with clients and subsequent client outcomes. We expected that the cognitive, behavioural, and psychological components of the communication intervention would increase nurses' knowledge and skills in communicating with clients which would in turn improve nurse and client outcomes. Articulating the causal model of change is important as it allows the evaluator to better understand, measure, and examine the mechanisms underlying the intervention effects and the dosage required to produce the effects. In addition, this type of information can be used to refine the design of the intervention in order to enhance its effectiveness and efficiency.

Outcomes refer to the changes that can be expected as a result of the intervention. They include the instrumental, intermediate, and ultimate effects. The framework also guides the evaluator as to the time to measure the outcomes.

In addition to identifying the variables, the framework specifies the relationships amongst them, from which hypotheses are derived and tested. These relationships generally include the following: (a) the characteristics of the clients, the interveners, and the settings influence the delivery of the intervention and ultimately the components and dose actually received by clients, and (b) the intervention components and/or dose in turn influence achievement of the outcomes (Sidani & Braden, 1998).

STRENGTHS AND LIMITATIONS OF THE THEORY-DRIVEN APPROACH

The TDA helps evaluators and decision makers understand and explain why an intervention does or does not work in the context of everyday practice (Rogers, Petrosino, Huebner, & Harsi, 2000; Sidani & Braden, 1998). Subsequently, the findings are more relevant and useful to decision makers (Lipsey, 1993; Sidani & Sechrest, 1999).

Specifically, studies using the TDA have the potential to provide data on the actual components of an intervention and the doses that are necessary to achieve the outcomes. From an evaluation, clinical, and policy perspective, these data are very informative. Knowing the nature and magnitude of the relationship between intervention dose and outcomes may be useful in determining the minimal dose of an intervention needed to produce the desired changes (Lipsey, 1993). This information can then guide refinement of an intervention dose to enhance its efficacy and efficiency. Similarly, understanding the factors that influence outcome achievement is helpful in identifying the conditions that potentiate or weaken the effectiveness of the intervention in producing the desired effects (Lipsey, 1993). This knowledge can guide future applications of the intervention in practice, as well as modifications of the intervention, in order to promote its beneficial effects. It can also be used to more effectively target resources to specific populations and specific contexts.

From a research perspective, modelling variables that may influence the delivery of the intervention and achievement of the outcomes reduces the error variance in the statistical analyses. Decreasing error variance minimizes the occurrence of a type 2 error of inference, that is, concluding that an intervention is not effective when in fact it is (Chen & Rossi, 1987; Lipsey, 1990). Measuring the actual components and doses received accounts for the variability in intervention implementation and subsequently increases the statistical power to detect significant intervention effects (Cook & Poole, 1982) and enhances the validity of the study conclusions.

The TDA approach also facilitates the development of a conceptual framework that can then be used to guide practice and research in which the framework can be further tested and refined. This is necessary to build a sound knowledge base explicating the contribution of the factors specified in the framework to outcome achievement

which can ultimately guide clinical and managerial decision making and policy development.

On a more practical level, however, use of the TDA approach requires the evaluator to collect and analyze more data. This may increase the financial and time demands for completing the evaluation study (Fitz-Gibbon & Morris, 1996; Reynolds, 1998). Likewise, it may increase the response burden for clients. Lastly, the large number of variables included in the evaluation study to reflect the factors in the framework necessitates a larger sample size and the use of multivariate statistical techniques to analyze the data. This may be regarded as a limitation since acquiring large sample sizes in long-term care facilities is often problematic, as nursing staff and clients may not be comfortable participating in evaluation studies and a large proportion of clients are unable to complete self-report scales (McGilton et al., 2003). Conducting a pilot study to determine the most important variables to include in the model is one way to overcome this limitation.

PILOT STUDY

In this section we provide a brief overview of the communication enhancement intervention and the methodology used to pilot test it.

The Intervention

The communication training intervention incorporated three components that were provided as one package: cognitive, behavioural, and psychological. The cognitive component aimed at providing nurses with the knowledge necessary to understand how to use communication enhancement techniques with their clients, including how often to use them. The intervention was based on a review of effective communication skills and included the theoretical underpinnings of Solution Focused Brief Therapy (SFBT) (de Shazer, 1982). A 30-minute training session provided by one of the investigators included information on (a) how to initiate a conversation, (b) how to speak with depth and clarity during interactions, (c) how to use active listening techniques, (d) how to focus on the strengths and abilities of the clients, and (e) the importance of following up on concerns that arise. The goal of the communication enhancement approach was to shift the nurse-client interaction from being negative and problem-oriented to being positive, collaborative, and solution-focused.

The behavioural component focused on improving the staff's communication skills necessary for using them in practice. During the training session, each nurse was asked to role play an interaction with another nurse in order to reinforce learning of the communication behaviours. Staff were also given direction on how to communicate with their clients. In this component of the program, the staff were given two opportunities to demonstrate their newly acquired skills with an advanced practice nurse who subsequently provided the nursing staff with constructive feedback.

The psychological component was directed at helping the staff deal with their feelings regarding implementing the communication skills into practice. This component involved weekly support sessions with the investigators to discuss difficult communication encounters and explore the nurses' concerns and feelings about implementing the new skills into practice. All three components were delivered at various intervals during the 10-week communication training program.

Following the initial training session by the investigators, nursing staff were asked to spend two minutes each day with their clients using the communication approach, while not delivering hands-on care, at a time most convenient for the client. The nurse was instructed to ask the client the following questions during their interaction: (a) How are you today? (b) How are you feeling? and (c) Is there anything else I can do for you? Each nurse was asked to record, on an intervention card developed by the investigators, the client's responses to these questions, the length of time of the interaction, whether it was the day or evening shift, and the nurse's perceived level of ease or challenge of the interaction.

Methodology

For the pilot study, a mixed quantitative and qualitative design was used. A one-group pretest and posttest design was used to evaluate the effects of the 10-week communication enhancement intervention. Unstructured focus groups were conducted to explore the nurses' perception of the intervention and the factors that influenced their ability to use the communication strategies with clients. The study was conducted on one unit of a university-affiliated Complex Continuing Care facility. All nursing staff were invited to participate in the study. The clients on the unit had experienced life-altering events such as strokes or acquired brain injuries and had high acuity needs. Clients on the unit were eligible to participate if they were cognitively

able to respond to questions and able to understand English. The pretest data were collected at the beginning of the communication teaching sessions. The posttest data were collected immediately after the 10th week of intervention.

Screening of the clients' cognitive capacity was done using the recall score (RS), which was calculated based on information from the Minimum Data Set (RAI-MDS 2.0). According to Simmons and Schnelle (2001), RSs greater than 2 indicate that the client has the cognitive capacity to complete a self-report questionnaire. Of those clients who met the eligibility criteria, 17 (77%) agreed to participate. Of the full-time, part-time, or casual registered nurses (RNs), registered practical nurses (RPNs), and health care aides (HCAs) working on the unit, 22 (61%) agreed to participate (7 RNs, 10 RPNs, and 5 HCAs).

APPLICATION OF THE THEORY-DRIVEN APPROACH

In this section, we illustrate the application of the TDA using examples from the pilot study that aimed at evaluating the communication intervention. The application of the TDA required the development of a framework, which was derived from a comprehensive review of relevant literature and was refined based on the results obtained in the pilot study. Figure 1 depicts the refined framework.

Input

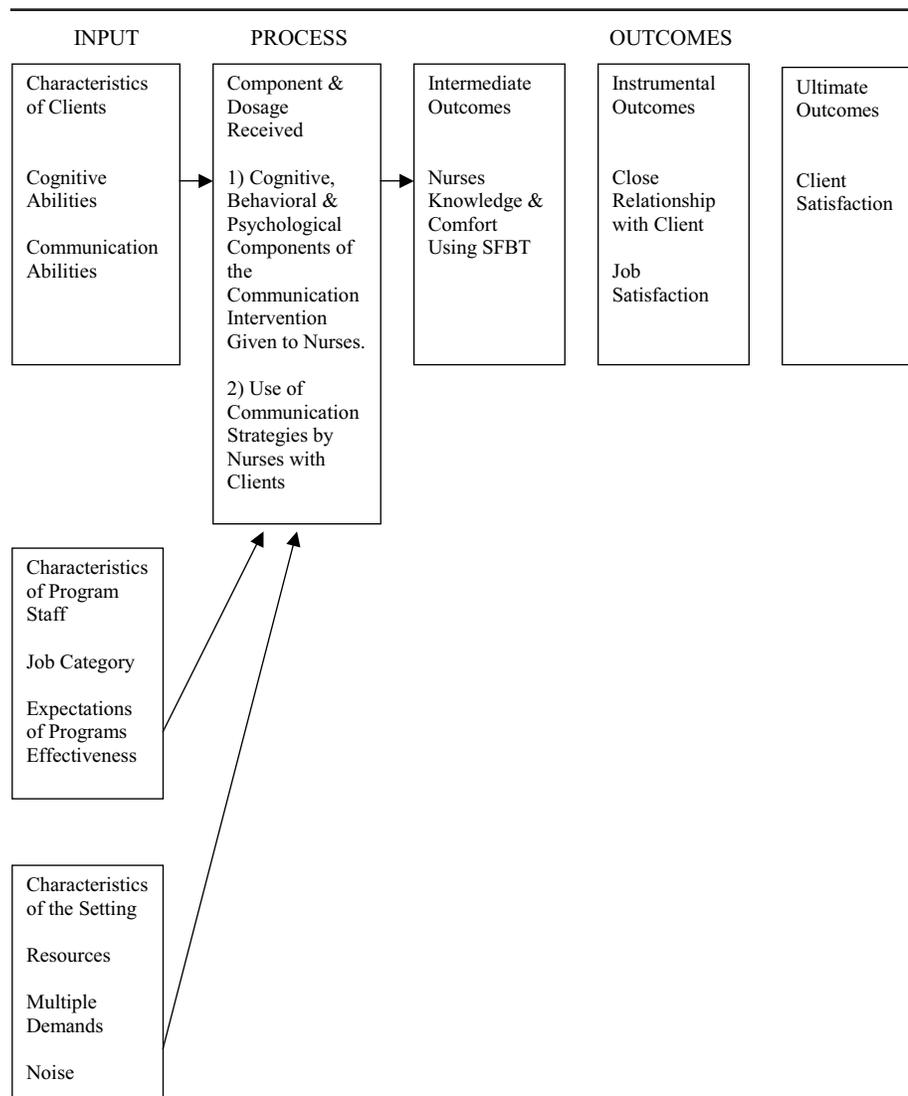
The characteristics of the clients, the nursing staff, and the setting that influence the delivery of the communication intervention are described next.

Characteristics of the Clients

The main client characteristic that could affect the nurses' use of the communication strategies is the clients' ability to communicate effectively, since in complex continuing care environments up to 50% of clients have speech impairments (Bryan et al., 2002). Unlike the majority of previous communication intervention studies, we did not exclude clients who had speech impairments, used a speech-enhancing technological device, or had mild to moderate cognitive impairment. The limited exclusion criteria allowed us to include the subgroups of clients seen in everyday practice and to examine the effects of their level of communication on treatment implementation and outcome achievement.

To investigate the effect of patient characteristics on treatment implementation, we examined whether the clients' ability to make themselves understood was linked to the dosage of the communication intervention that they had received. The dose of the interven-

Figure 1
Conceptual Framework for Operationalizing the Communication Program Intervention



tion was determined by the total number of times nurses interacted with their clients over the 10-week intervention period. We found the clients' ability to make themselves understood negatively correlates with the dose ($r = -.37$). That is, the more difficult it was to understand the client, the less communication interactions were provided to the client. To examine the effects of the clients' level of communication on outcome achievement (i.e., client satisfaction), we performed a change score analysis. Although hierarchical linear modelling (HLM) is recommended for individual level analyses (for more detail, refer to Raudenbush & Bryk, 2002), it was not feasible due to the small sample size in our pilot study ($n = 17$ clients). Despite its limitation, change score analysis provided preliminary evidence of the direction of change in the outcomes observed in this sample of 17 clients. We computed a patient satisfaction change score by subtracting the scores obtained at posttest from the scores obtained at pretest. We hypothesized that the nursing staff would implement their newly acquired communication techniques with clients whom the nurses had the least amount of difficulty understanding. To test our hypothesis, we regressed the patient satisfaction change score onto the MDS patient variable "ability to make themselves understood." A negative moderate effect ($B = -.47, p = .05$) was found, accounting for 16.5% of the variance in the outcome. The more the nurses found the client difficult to understand, the less there was a change in patient satisfaction. This finding could be related to the minimal interactions the nurses had with clients unable to make themselves understood.

Characteristics of the Program Staff

The results of previous studies suggested that job category of staff (Caris-Verhallen et al., 2000; Davies, 1992; Thomas, 1994) would have the main influence on staff's communication practices. Most communication intervention studies have included either all regulated staff including RNs and RPNs (Bowles et al., 2001) or unregulated staff including HCAs (Bryan et al., 2002; Williams et al., 2003). However, in clinical practice, clients interact with all categories of staff. Therefore, we did not have specific selection criteria for nursing staff, and all were invited to participate. We subsequently examined the influence of nursing staff category (i.e., regulated and unregulated) on the dose of the intervention by monitoring the number of times each staff member interacted with his or her assigned clients using the communication strategies discussed during the teaching sessions. We found no statistically significant differ-

ences between dose delivered by the unregulated staff (mean = 15.6) and regulated staff (mean = 14.4). This finding could be related to the barriers, as articulated by the staff, that prevented them from delivering the intervention at the intended dosage. Consequently, nursing staff category may not be an influential staff characteristic affecting the number of times staff interacted with their clients.

We were also interested in the extent to which staff category influenced their comfort level communicating with clients, which is conceptualized as an intermediate outcome (Figure 1). Based on previous work by McGilton (2001) and Winchester (2003), we proposed that regulated staff would perceive a higher comfort level communicating with their clients than unregulated staff. We measured comfort level using the Nurses' Interactional Comfort Survey, which is a six-item Likert scale (Bowles et al., 2001). The survey measures nurses' perception of their competence, confidence, willingness, frequency, and scope of practice related to interacting with clients. We computed a comfort change score by subtracting the scores obtained at posttest from the scores obtained at pretest. There was a statistically significant difference in the mean change scores ($t = 2.10$, $p = .04$) on comfort level between the groups. The regulated staff showed an increase in their level of comfort communicating with clients as compared to unregulated staff. These differences in comfort level may be related to the fact that training in communication skills is not a major component of the curriculum for unregulated staff, as indicated by the qualitative data obtained in the focus groups. For example, following the intervention, at least two staff members expressed the feeling that their Health Care Aide training courses did not adequately prepare them for communicating with clients with speech impairments. Similarly, in practice unregulated staff were observed seeking the advice of professional staff regarding how to deal with the clients' concerns.

Characteristics of the Setting

We had no adequate preliminary evidence to suggest that specific characteristics of the setting would influence the intervention delivery or outcomes. Subsequently, we did not quantitatively measure variables related to the setting characteristics in the pilot study. However, we conducted focus groups with the nursing staff upon completion of the intervention. Focus groups generally serve three purposes: (a) to uncover potential side effects of the intervention (Davidson, 2000); (b) to understand what parts of the program must

be retained and what parts can be changed, or even abandoned (Hacsi, 2000); and (c) to determine the psychosocial, physiologic, economic, and organizational processes that mediate the relationship between exposure to the program and the participant outcomes (Chen, 2003; Weiss, 1997). We wanted to understand the staff's perceptions of how the units' characteristics influenced their ability to deliver the intervention.

Staff focused their responses on setting characteristics that impeded their ability to deliver the intervention. The majority discussed their concerns about not finding enough time to interact each day with their clients. They identified the following factors as limiting the time available for communication: "looking for supplies from the cart, phoning staff to come in to cover the next shift, assisting and teaching agency staff, caring for families, answering phones, and getting snacks for clients and warming them up." Additional setting factors that impeded the nurses' delivery of the intervention included the clients' roommates calling out for the nurse, other nurses' requests for assistance, and the roommate's loud TV or radio. This information suggests that having adequate resources, balancing multiple demands, and minimizing noise are prerequisites to carrying out the intervention. Moreover, it underscores the need to account for the effects of these factors in future communication enhancement interventions. We have therefore included these factors in our framework to refine the intervention implementation in the future.

Process

For this pilot study, the process variables consisted of (a) the communication intervention that the staff delivered to the clients, including its components and dosage, and (b) the sequence of changes that were expected to take place. First, staff were expected to gain knowledge and comfort using the new communication techniques, which would facilitate a closer relationship with the client and increase job satisfaction. Following these changes for staff, the ultimate outcome would be that the clients are more satisfied with their care.

The dose of the delivery of the intervention was measured, as the TDA acknowledges that in the real world, there will most likely be variability in the delivery of the intervention. Variability in intervention implementation is associated with differences in outcome achievement (Lipsey, 1990). Therefore, it was important for us to closely monitor the intervention delivery and the dose that each cli-

ent received. The amount, frequency, and duration of each nurse's interaction with each client using the enhanced communication skills were measured. The study protocol outlined that staff members would interact with their assigned clients using the communication techniques taught in the sessions. Therefore we anticipated that 70 nurse-client interactions (e.g., 1 interaction per day x 7 days per week x 10 weeks) would occur over the 10-week intervention period. Instead, on average only 15 interactions between the nurse and client occurred over the 10-week period, with a range between 2 and 40 (McGilton, Irwin-Robinson, Boscart, & Spanjevic, in press). Subsequently, we found this variability in the dose of the intervention to positively correlate with clients' satisfaction with care ($r = .26$). That is, the more interactions staff had with their clients, the more clients perceived that nursing staff related well to them as measured by the Relational Care Scale (McGilton, O'Brien-Pallas, Pringle, Wynn, & Streiner, 2005).

Outcome

Outcomes are the changes that can be expected as a result of the intervention (Sidani & Sechrest, 1999). The selection of the outcomes was guided by the results of previous communication training intervention evaluations (Bryan et al., 2002; Williams et al., 2003). The framework requires specification of the nature, expected timing, and pattern of change in the outcomes. Following the communication enhancement intervention, as indicated in Figure 1, a planned sequencing of changes was anticipated to result in achievement of the desired outcomes. Some changes were expected to occur immediately after the program implementation while others were expected to take longer to appear. The intermediate outcomes involved an enhancement of nurses' knowledge of, and comfort using, enhanced communication skills in practice (Bowles et al., 2001), followed by the instrumental outcomes of nurses' development of closer relationships with clients (Sundin, Jansson, & Norberg, 2000) and improved job satisfaction (Bryan et al.). At the end of the 10-week intervention, the expected ultimate outcome involved perceptual changes in clients' level of satisfaction with care (Bowles et al.). Based on the empirical findings of the pilot study, nurses' comfort level in communication did not improve over time. However, instrumental outcomes improved, as nurses did experience closer relationships with their clients ($t = 2.14, p < .05, df = 19$) and improved job satisfaction ($t = 2.5, p < .05, df = 19$). Clients' level of satisfaction did not improve over the duration of the intervention (McGilton et al., in

press). The most probable reason for the lack of a significant change in the outcomes' level was, as mentioned earlier, that some clients did not actually receive the required dose of intervention.

CONCLUSIONS

The TDA to intervention effectiveness evaluation recognizes the individuality of both the nurse implementing the intervention and the recipient of the intervention. It also recognizes that nurses present with individual characteristics (i.e., job category) that shape their experiences with, and adherence to, the intervention just as clients present with unique characteristics (i.e., communication ability) that shape their response to it. The TDA advocates attendance to nurse and client characteristics in terms of measuring the effects of these characteristics on intervention delivery and outcomes expected of the intervention. Knowledge of who is receptive to an intervention and who benefits from it can be used to guide nursing practice. That is, nursing staff would be better positioned to select interventions that are appropriate to patient needs.

The framework proposed here is one strategy for putting a program theory into operation. Developing a framework guides the design and the conduct of evaluation studies. The framework incorporates variables that reflect theoretical concepts and implementation issues. Measuring and including these variables in the analyses not only enhances the validity of the conclusions regarding the effectiveness of the program, but also provides answers to the practical questions of who benefits the most, from which program component, at which dosage, and under what conditions (Sidani & Sechrest, 1999). To this end, we have initial empirical evidence regarding which mechanisms are most important in producing the outcomes of our programs. We will subsequently use this evidence to further refine our intervention so that its effectiveness can be enhanced. For example, our pilot study identified that: (a) clients who were rated as more difficult to understand actually received a lower dose of the communication intervention; (b) the greater the communication difficulty, the less change there was in patient satisfaction; (c) unregulated staff experienced more discomfort delivering the intervention; and, (d) having adequate resources and minimizing environmental noise are requisites to carrying out the intervention effectively. Despite the small sample size, the results of this pilot study could be used to refine the design and implementation of the intervention. We will use this information to develop a new compo-

ment of the intervention in which the staff will receive additional education from a speech language pathologist to help them learn to individualize the intervention for clients with speech difficulties. Moreover, we will have the regulated staff deliver the intervention to clients with communication difficulties and unregulated staff deliver the intervention to clients with fewer difficulties. We will enlist the support of administrators to ensure that the requisite resources are available, and we will include these variables in our framework and measure their effects on the dose of the intervention and subsequent achievement of the outcomes. Lastly, we will test the influence of the factors, as identified in Figure 1, in a large-scale evaluation study. Doing so has the potential not only to increase the internal and external validity of our study findings but also to bridge the research-practice gap.

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