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Résumé

Améliorer l'évaluation de l'efficacité des soins infirmiers

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Pour établir une solide base de connaissances servant à orienter la pratique, il est essentiel de pouvoir évaluer l'efficacité des soins infirmiers. Les nombreuses études qui ont été menées sur le sujet visaient à évaluer les interventions en fonction des résultats escomptés. Toutefois, même si les résultats qu'elles présentent sont encourageants, ces études ne fournissent pas un portrait exhaustif et réaliste de l'utilité des soins infirmiers, ni ne tiennent compte des caractéristiques des patients ou de l'exécution des soins. Le choix des résultats ne reflète pas non plus les bienfaits directs découlant des soins infirmiers. Cet article traite des méthodes de recherche évaluative susceptibles de mettre en lumière le rôle unique des soins infirmiers dans un cadre réaliste et quotidien; les auteures fournissent des exemples concrets pour illustrer leur propos.

Mots clés : évaluation des soins infirmiers, méthodes de recherche, caractéristiques des patients, résultats

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Enhancing the Evaluation of Nursing Care Effectiveness

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Evaluating the effectiveness of nursing care is necessary for developing a sound knowledge base to guide practice. Several studies have been conducted to evaluate the effectiveness of nursing care or interventions in producing the desired outcomes. While the results of these studies are encouraging, they do not provide a comprehensive and realistic evaluation of the contribution of nursing. Factors related to patient characteristics and implementation of care are not accounted for. The outcomes selected do not reflect the direct benefits of nursing care or interventions. In this paper, research methods for conducting effectiveness research in a way that would identify the unique contribution of nursing care delivered under the conditions of the real world of everyday practice are discussed. Examples are provided to illustrate the points of discussion.

Key words: nursing care and intervention evaluation, research methods, participant characteristics process evaluation, outcomes

With the increasing demand for accountability, nurses must demonstrate the effectiveness of the care they provide in producing favourable outcomes (Elkan, Blair, & Robinson, 2000). This demand is met by systematically investigating the effects of nursing care on intended, desired outcomes. The effects of nursing care are evaluated at two levels. The first entails specific nursing interventions (referred to as nursing intervention, hereafter) that address a particular clinical problem experienced by patients. Patient education and music therapy are examples of nursing interventions aimed at enhancing the patient's knowledge of self-care and managing anxiety, respectively. The second level is more global. It focuses on the quality of care in general (referred to as care, hereafter). At this level, nursing is often represented with the structural variable of staff mix, nursing worked hours per case, or care delivery model. Outcomes that are frequently examined include mortality, morbidity (or complications), and patient satisfaction with care (e.g., Aiken, Smith, & Lake, 1994; McGillis Hall et al., 2001; Tourangeau, Giovannetti, Tu, & Wood, 2002).

The results of studies that evaluate the effects of nursing interventions or care are encouraging because they demonstrate nursing's contribution to outcome achievement. They do not, however, comprehensively and accurately depict the effectiveness of nursing interventions and care. These studies tend to focus on the direct relationship between the vari-

able representing nursing and the selected outcomes, to the exclusion of other factors that could affect the outcomes. The focus on this direct relationship is not consistent with the focus of effectiveness research. The purpose of effectiveness research is to test the robustness of the intervention or care effects for different subgroups of the target patient population, under the conditions of the real world of everyday practice (Whittemore & Grey, 2002). In addition, the focus on the direct relationship between nursing and outcomes does not realistically reflect the complexity of the real world of everyday practice where the intervention or care is provided. Further, the outcomes selected in the investigation of these direct relationships tend to be generic, reflecting the indirect benefits of nursing interventions and care (Mitchell, Ferketich, & Jennings, 1998).

Several factors, inherent in everyday practice, influence the delivery and expected outcomes of nursing intervention or care. Of particular interest in effectiveness research are the factors associated with the characteristics of the patient receiving care and with the nature of the care provided (Cohen, Saylor, Holzemer, & Gorenberg, 2000; Mitchell et al., 1998; Sidani & Braden, 1998). A failure to account for these factors when evaluating nursing care effectiveness limits our understanding of the patient subgroups that most benefit from the intervention or care, and the specific component and dose of the intervention or care that contribute to the achievement of desired outcomes (Hegyvary, 1993; Sidani & Braden). Knowledge of which patient subgroups benefit from which component(s) of intervention or care, at which dose, is needed to guide the appropriate prescription and the continuous improvement of intervention or care delivery (Costner, 1989; Goldfried & Wolfe, 1996). Generic outcomes are not reflective of or responsive to the nature of the intervention and care. Therefore, they will not detect the expected intervention or care effects. Generic, insensitive outcomes may lead to incorrect conclusions about nursing care effectiveness.

A realistic, comprehensive evaluation of nursing care effectiveness takes into account the complexity of the real world of practice. Such an evaluation demands that researchers attend to patient characteristics and to the nature and implementation of nursing intervention or care. Also, it requires a careful selection of outcomes and of instruments measuring the outcomes. In this paper we present the research methods used to address patient characteristics, the nature and implementation of nursing care, and outcome selection in previous effectiveness studies. The importance of attending to these factors and strategies for refining the design and conduct of effectiveness research are discussed and illustrated with recently published studies. Each section addresses one of these three factors.

Investigating the Influence of Patient Characteristics

In studies evaluating the effects of any treatment, the focus on demonstrating a direct relationship between the treatment and the anticipated outcomes led to an emphasis on controlling any factors that influence outcome achievement (Cook & Campbell, 1979; Lipsey, 1990). The most important factors are the characteristics of the patients receiving care. They are considered extraneous factors that may influence the outcomes. Therefore, patient characteristics are controlled for by carefully selecting participants or by residualizing or adjusting the outcomes for the effects of patient characteristics before determining the impact of the intervention or care on the outcomes.

Controlling the influence of patient characteristics on outcomes produces results that support the effectiveness of the intervention or care for a subgroup of patients who meet the selection criteria. The results are not applicable to various subgroups of patients seen in everyday practice (Brown, 2002; Sidani & Braden, 1998). Yet, identifying patients who benefit from the intervention or care is important to guide practice. Knowledge of which patients do and do not benefit from the intervention guides the provision of appropriate care and the design and delivery of care to various patient subgroups. In generating this type of knowledge, we are required to view patient characteristics not as extraneous factors that should be controlled but as substantive factors of interest (Goldfried & Wolfe, 1996; Sidani & Braden). Therefore, the influence of patient characteristics on outcome achievement is examined.

The application of this perspective in effectiveness research requires identification of pertinent patient characteristics that affect the intended outcomes, measurement of the characteristics, and determination of their influence empirically. Identification of pertinent characteristics is based on the theory underlying the intervention or care, previous research, or clinical observations (Sidani & Braden, 1998). Participants who have these characteristics are included in the study, rather than excluded as is conventionally done. Therefore, the selection criteria are non-restrictive, involving a minimal set of exclusion criteria.

Selecting participants on the basis of non-restrictive criteria increases the likelihood that various subgroups of the target population are represented (Glasgow, Vogt, & Boles, 1999; Whittemore & Grey, 2002). These subgroups are defined by their profiles on pertinent characteristics and are anticipated to show variability in outcome achievement. Data are then collected on the pertinent characteristics, using standard measures of demographic, personal, and health-related variables. Subgroup analyses are conducted to examine differences in the outcomes among subgroups of participants. Factorial analysis of variance (ANOVA) or

Hierarchical Linear Models (HLM) are statistical techniques used to conduct subgroup analyses (Brown, 2002; Sidani & Braden, 1998).

Few nursing care effectiveness studies have investigated the influence of patient socio-demographic, personal, and health-related characteristics on outcomes. Two studies illustrate the application of the perspective that considers patient characteristics of substantive interest. These studies evaluated nursing effectiveness at the level of interventions. In a meta-analytic study, age was found to be negatively associated with the knowledge of self-care gained following psycho-educational interventions (Brown, 1992). Older participants had a low level of knowledge. Gender differences were reported in the outcomes expected of an early home-recovery-information intervention in patients who underwent coronary artery bypass graft surgery (Moore & Dolansky, 2001). Women reported poorer physical functioning and more symptoms than men at post-test. Results of several studies that evaluated effectiveness at the level of nursing care support the direct relationship between patient characteristics and outcomes. Patients' age and health status (operationalized as severity of illness, comorbidity, or perception of general health) were found to be significant predictors of complication rates (Geraci et al., 1999), fall-related injury (Jennings, Loan, DePaul, Brosch, & Hildreth, 2001), and satisfaction with care (Hargraves et al., 2001; Thi, Briancon, Empereur, & Guillemin, 2002).

The results of these nursing effectiveness studies indicate that patients with different characteristics benefit, to various extents, from nursing care or interventions. These findings are more informative than those of studies in which patient characteristics were controlled, and have clinical implications. When patient characteristics are controlled, the results indicate that the intervention or care was, on average, effective for patients who met the selection criteria. In contrast, the findings of studies in which the influence of patient characteristics was investigated inform nurses of the profile of patients who did and did not benefit from the intervention or care (Brown, 2002; Sidani & Braden, 1998). Nurses equipped with knowledge about who will benefit from the intervention or care are well prepared to plan and deliver the most appropriate care for the patient. For instance, based on the above findings, nurses may decide to give a psycho-educational intervention to young patients and to closely monitor elderly patients for complications. In addition, nurses who are aware of the subgroup of patients who would not benefit from the intervention or care are in a position to adjust or design new interventions or care that will meet the needs of this subgroup. The ultimate goal is to continuously improve the quality and effectiveness of nursing care for various patient groups.

Investigating the Nature and Implementation of Nursing Care

The nature of nursing investigated in effectiveness studies varies with the level of specific interventions and global care. Therefore, each level will be addressed separately in this section.

At the intervention level, nursing is defined by the specific intervention under evaluation. An intervention refers to a treatment or procedure that is implemented by nurses with or on behalf of patients to move the patients' conditions towards health outcomes that are beneficial for them (Snyder, Egan, & Najima, 1996). In an intervention effectiveness study, participants are assigned to the experimental group that receives the intervention under evaluation or to the control group that does not receive it. Every effort is made to ensure that the intervention is given in a consistent way to all patients in the experimental group. At the analysis stage, the intervention is usually operationalized with the group to which patients were assigned. The analysis performed to demonstrate the effectiveness of the intervention involves comparing the mean values on the post-test outcomes between the experimental and control groups. The post-test outcomes are expected to show significant changes in the experimental group and no changes in the control group. Therefore, significant differences in the groups' mean post-test outcome values support the effectiveness of the intervention in producing the intended outcomes. This analysis and its subsequent results are based on the assumption that all participants have received the same level or dose of the intervention and exhibit a similar response to the intervention (Lipsey, 1990). These assumptions, however, may not be met in effectiveness research where the intervention is evaluated under the conditions of everyday practice. Under these conditions, each patient receives the intervention from a different nurse, resulting in variability of implementation. This variability is associated with increased variance in the post-test outcomes. Increased variance in the post-test outcomes reduces the power to detect significant effects, leading to the incorrect conclusion that the intervention is ineffective (Conrad & Conrad, 1994; Cook & Campbell, 1979; Kirchhoff & Dille, 1994). When the variability in the implementation of the intervention is ignored, we are unaware of the intervention dose required to produce the intended outcomes (Sidani & Braden, 1998).

Researchers are encouraged to clearly identify the essential activities that make up the intervention and the dose at which the intervention should be given, monitor the implementation of the intervention, and measure the intervention dose in order to avoid incorrect conclusions about the effectiveness of the intervention. Measurement of the dose involves quantifying the extent of patients' exposure to the intervention (Reid & Hanrahan, 1988). The method used to quantify the intervention

varies with the nature of the intervention. It may include the amount (i.e., the quantity of intervention activities), frequency (i.e., number of times the activities are done), and duration of the intervention the participants actually receive (Scott & Sechrest, 1989). The variable quantifying the intervention dose is used to represent the intervention in the statistical analysis. The relationship between the dose and post-test outcomes is examined to determine the effectiveness of the intervention. The use of this strategy for quantifying the intervention is illustrated in the following study. Sidani (1999) quantified a psycho-educational intervention by the number of group sessions attended and used this value as the independent variable in the analysis. The results indicated a significant relationship between the intervention dose and the outcome of cancer-related knowledge. Participants who attended all sessions showed most gain in knowledge. The latter finding illustrates the advantage of this strategy for representing the intervention, which is to increase the statistical power to detect significant intervention effect (Cook & Poole, 1982). It also informs nurses of the intervention dose required to produce the intended outcomes.

At the nursing care level, nursing is primarily represented with the structural variable of staff mix or worked nursing hours per case in nursing care effectiveness studies. Significant relationships between staff mix and outcomes are reported, indicating that the more registered nurses there are, the better the outcomes will be. Although important, these findings have some conceptual and practical limitations. The structural variable of staff mix or worked hours does not accurately represent the nature of nursing care. Nursing care entails the performance of activities reflective of expected role functions and the provision of services. Thus, the variable of staff mix or worked hours does not clearly identify what exactly nurses do. The observed relationships between staff mix and outcomes fall short of specifying the processes responsible for producing the favourable outcomes (Cho, 2001; Mitchell, Heinrich, Moritz, & Hinshaw, 1997). The relationships assume that care was delivered, but do not indicate the nature, quality, and safety of the care actually given to patients (Meyer & Massagli, 2001) that made a difference in the outcomes. It is therefore important to examine the processes of care that contribute to outcome achievement in order to validly support the effectiveness of nursing care and to determine which aspects of care are beneficial and which require improvement.

The importance of examining the processes of care when evaluating the effectiveness of nursing care is currently recognized, as evidenced by the propositions of models advanced by several scholars (e.g., Aiken, Sochalski, & Lake, 1997; Cho, 2001; Irvine Doran, Sidani, & McGillis Hall, 1998; Mitchell et al., 1998). The processes to be included in effec-

tiveness studies can be derived from these models. Examples of processes of care are the interventions delivered by nurses and the independent and interdependent nursing role functions. Once selected, the processes are operationalized with appropriate variables. The process variables are then measured using reliable and valid instruments. The relationships among structure, process, and outcome variables are tested using regression, path, or structural equation modelling (SEM) analysis. The SEM analysis has the advantage of testing the direct and indirect relationships simultaneously, while accounting for measurement error. For example, Irvine Doran et al. (2001) operationalized the nursing interdependent role functions by the communication pattern among members of the health-care team and examined its relationships with selected structure and outcome variables. The results indicated that a higher proportion of regulated staff on in-hospital units was associated with the perception of open, accurate, and timely communication. In turn, communication contributed to improvements in the patients' functional status. Results of effectiveness studies that examine the impact of nursing care processes are valuable in elucidating the mechanisms through which nursing makes a difference and the unique contribution of nursing to outcome achievement. The findings also point to aspects of care requiring change in order to continuously improve the quality of care provided to patients.

Incorporating Specific Outcomes

When evaluating nursing care effectiveness, researchers tend to select multiple generic outcomes such as mortality, morbidity, falls, number of re-admissions, discomfort, and satisfaction with care (e.g., Aiken et al., 1994; Lichtig, Knauf, & Milholland, 1999; Tourangeau et al., 2002). These generic outcomes represent the indirect benefits of care and are of primary interest to health-care payers and policy-makers (Raskin & Maklan, 1991). Nursing care effectiveness studies need to investigate the impact of nursing on more specific outcomes that represent the direct benefits expected as a result of nursing intervention or care.

The need to investigate specific outcomes has some implications for the selection of outcome variables and outcome measures. The selection of outcome variables is based on the nature of the care processes or interventions being evaluated, and on the anticipated direct and indirect effects. Therefore, the selected outcomes should be specific and sensitive enough to reflect the goal and effects of nursing care or interventions (Sidani & Braden, 1998; Twinn, 2001). The selection of outcomes in effectiveness studies should be guided by the process of care or intervention under evaluation. The outcomes are derived from the purpose of the intervention or process of care, its nature (i.e., the activities that make up

the process of care or intervention), and its anticipated direct and indirect effects. For example, the goal of in-hospital patient education is to provide patients with the knowledge necessary for appropriate self-care at home. Patient education often involves discussion with the nurse, demonstration of self-care strategies, and provision of written materials for future reference. Based on this description of the intervention, the expected direct outcomes include enhanced self-care knowledge and post-discharge performance of self-care strategies. If achieved, the two outcomes will contribute to the indirect effect of improved functioning. Similarly, coordination of patient care focuses on providing the care that patients need to manage their condition without delay. Coordination consists of communicating patients' needs to other members of the health-care team and ensuring that the appropriate interventions are given promptly. Thus, the direct outcomes expected of coordination of care are improved functioning, perception of being well cared for, and timely discharge. The indirect outcomes are a reduction in health services utilization and health-care costs. The direct outcomes mentioned in these examples are consistent with the nature and purpose of the intervention or process of care. Therefore, it is anticipated that the direct outcomes will be more responsive to the intervention or care under evaluation than the indirect outcomes. Achievement of the indirect outcomes is contingent on the production of the direct outcomes (Sidani & Braden). The results of the study by Irvine Doran, Sidani, Keatings, and Doidge (2002) support the point that nursing care has a direct and indirect impact on nursing-sensitive outcomes. The authors examined the effect of the independent and interdependent nursing functions on the patients' self-care ability, functional status, and mood. The independent function was operationalized with the patients' perception of the quality of nursing care, while the interdependent function was represented by communication among health-care providers and coordination of care. The independent and interdependent nursing functions had the strongest effect on the patients' reported self-care ability, which in turn affected the patients' functional status and mood.

Once the direct and indirect outcomes are specified, they should be measured. Instruments measuring outcomes must be reliable, valid, and sensitive to change (Stewart & Archbold, 1992). Unreliable measures introduce error, which reduces the statistical power to demonstrate effectiveness. Invalid measures do not capture the specific domains of the outcomes under study. Consequently, invalid measures are not capable of detecting the expected effects, leading to the erroneous conclusion that the care or intervention is not effective. Sensitivity to change is a psychometric property that is critical for detecting change in the outcomes

following the receipt of care or intervention. A change in outcome scores is the cornerstone for determining effectiveness.

The selection of outcome measures is done very carefully through a critical review of the instruments and relevant literature. The conceptual and operational definitions of the concept provided in the literature should be systematically compared with those of the outcome variables included in the effectiveness study. An instrument is selected if its content covers the specific indicators of the outcome variable in order to enhance the accuracy and consistency of the operationalization process (Lipsey, 1990; Sidani & Braden, 1998). For instance, self-care encompasses several domains such as symptom monitoring and management, taking medications, and engaging in health promotion behaviours. If self-care is an outcome used to evaluate the effectiveness of patient education, and if patient education does not instruct patients in health promotion, then the latter domain of self-care should not be measured, because it does not validly reflect the domains of the outcome variable of interest. Relevant literature is critically reviewed to determine the extent to which the instrument has demonstrated reliability, validity, and sensitivity. Doran (2003) synthesized the literature relevant to various nursing-sensitive outcomes and instruments measuring them.

Conclusions

The evaluation of the effectiveness of nursing care and interventions is essential for developing a sound knowledge base to guide the design, delivery, and continuous improvement of nursing services. In order to clearly identify the contribution of nursing within the health-care system, researchers must consider the conditions of everyday practice where multiple factors influence outcome achievement. The multiple factors encountered in clinical practice cannot merely be controlled or ignored in effectiveness research. This would lead to results that do not realistically reflect the complexity of everyday practice and would yield incorrect conclusions about the impact of nursing care or interventions. The results would not clearly delineate what it is that nurses do, what outcomes are affected by nursing care or intervention, and what specifically contributed to the favourable and unfavourable outcomes.

Research methods were presented to improve the design and conduct of effectiveness studies in three ways. First, the methods described can assist researchers to determine the influence of patient characteristics on outcome achievement. Second, the methods encourage researchers to clearly describe the processes of care or interventions, to monitor their implementation, and to examine the relationships between their implementation and outcomes. Third, strategies were discussed for incorporat-

ing outcomes that reflect the direct and indirect impact of nursing care or interventions in effectiveness research. The goal of these methodological suggestions is to generate a sound and valid knowledge base that provides an accurate and comprehensive picture of what nurses actually do and the difference they make in the lives of patients. Understanding which patients with which characteristics benefit from which aspect of nursing care or intervention, given at what level, is essential for guiding clinical decision-making. This process enables nurses to provide the most effective, efficient, and appropriate care to meet the patients' needs and preferences. Knowledge of what contributed to the favourable and unfavourable patient outcomes provides feedback for refining nursing care, thereby enhancing its quality.

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