A Delphi Study on Research Priorities for Trauma Nursing

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• **OBJECTIVES** ***To identify and prioritize research questions of importance to trauma patient care and of interest to trauma nurses.***

• **METHOD** ***A three-round Delphi technique was used to solicit, identify, and prioritize problems for trauma nursing research. In round 1, experienced trauma nurses (N=208) generated 513 problems, which were analyzed, categorized, and collapsed into 111 items for subsequent rounds. Round 2 participants rated each research question on a 1 to 7 scale on two criteria: impact on patient welfare and value for practicing nurses. Group median scores provided by 166 round 2 respondents and respondents' individual round 2 scores were indicated on the round 3 questionnaire. Subjects rated the questions again on the same criteria and indicated whether nurses, independently or in collaboration with other health professionals, should assume responsibility for that research. Median and mean scores and rank order were determined for each item.***

• **RESULTS** ***Respondents who completed all three rounds (n=137) had a mean of 8.3 years of trauma experience. Nine research questions ranked within the top 20 on both criteria. The two research questions that ranked highest on both criteria were: What are the most effective nursing interventions in the prevention of pulmonary and circulatory complications in trauma patients? and What are the most effective methods for preventing aspiration in trauma patients during the postoperative phase? The third-ranked question regarding patient welfare was: What psychological and lifestyle changes result from traumatic injury? Regarding value for practicing nurses, What are the most effective educational methods to prepare and maintain proficiency in trauma care providers? ranked third.***

• **CONCLUSION** ***These research priorities provide impetus and direction for nursing and collaborative investigation in trauma care. (American Journal of Critical Care. 1994;3:208-216)***

Challenges for nurses working in the rapidly changing milieu of trauma care are enormous. New treatment regimens continually force reexamination of old assumptions about patients' needs and demand the development of innovative strategies for effective nursing care. Due to the dynamic nature of both the trauma population and the healthcare environment, research problems abound. The need for clinical research in trauma nursing is apparent in all phases of the trauma continuum.

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At the federal level, the Model Trauma Care Systems Plan[1] identified the importance of research as a component of trauma systems evaluation:

- Develop a plan for trauma research activities.
- Incorporate research activities as part of the trauma system assessment and utilization review.
- Describe the process to fund continued research contributions within the trauma system.

Standards of the Pennsylvania Trauma Systems Foundation,[2] an agency empowered by the Commonwealth of Pennsylvania to develop a statewide trauma system and accredit trauma centers, mandate research as integral to the mission of regional resource trauma centers. As trauma becomes more widely recognized as a specialized area of nursing practice, "trauma nurses are in an ideal position to identify potential topics for trauma nursing research."[3] As has been the case in other nursing specialty areas such as critical care and oncology,[4-6] the delineation of scientific priorities encourages the generation of new knowledge.

As nurse members of the Education and Research Committee of the Pennsylvania Trauma Systems Foundation, the authors recognized the need to identify research problems of importance to trauma patient care. The realities of such limited resources as qualified investigators and available funding makes prioritization of research efforts essential. As identified by Lindeman,[7] three assumptions support the desirability of establishing research priorities:

1. The research generated would have professional and social relevance.
2. Programs of research would be more effective in producing changes in patient care than would single, isolated studies.
3. Utilization of research would be more likely to occur if the initial research had high social relevance.

Based on the challenges of trauma care, the evolution of trauma nursing as a specialty, and the value of developing a program of trauma nursing research for the future, we identified the purposes of this study as follows:

- Identify significant aspects of trauma nursing for which the scientific base is currently inadequate.
- Reach consensus on urgent nursing problems amenable to research.
- Prioritize research questions likely to have the most impact on patient welfare and value for trauma nurses.
- Identify whether the proposed research questions were primarily within the realm of independent nursing research or required interdisciplinary collaboration.

Review of the Literature

A review of the healthcare literature reveals a paucity of research in trauma nursing.[8] Smeltzer[8] proposed a model used to discuss current research in trauma nursing and to suggest further areas for research. Mitchell et al[9] reviewed research and nonresearch literature, forming the framework for a discussion of the state of the art of trauma nursing. Subsequently, they generated research questions that would be of interest to trauma nurses. However, no report to date has used a consensus approach for the identification of research priorities in trauma nursing.

The Delphi method is aimed at providing such consensus. Its use in nursing was first reported in 1974 by Lindeman,[10] who directed a Delphi study for the Western Interstate Commission for Higher Education to determine priorities for clinical nursing research. The American Nurses' Association also employed this method to generate priorities for nursing research in the 1980s.[11] Oberst[6] identified priorities for cancer nursing research. The Delphi method was also used by mental health nurses[12] and by nurse administrators.[13]

Results from Delphi studies that are of particular interest to trauma nurses include studies conducted in the specialties of critical care, occupational health, and burn nursing. In 1983 Lewandowski and Kositsky published a study by the American Association of Critical-Care Nurses.[4] Occupational health research priorities were reported by Rogers in 1989.[14] Since then, nurse members of the American Burn Association conducted a four-round Delphi study to set research priorities in the specialty of burn nursing.[15] Both the American Association of Critical-Care Nurses[5] and the Emergency Nurses' Association[16] have also identified new research priorities.

In summary, the Delphi method has been widely used as a respected method of identifying nursing research problems and setting priorities. Although findings of previous Delphi studies are of interest to trauma nurses and important to trauma care, they do not comprehensively address the spectrum of unique needs of trauma patients. Therefore, the present study was undertaken.

Method

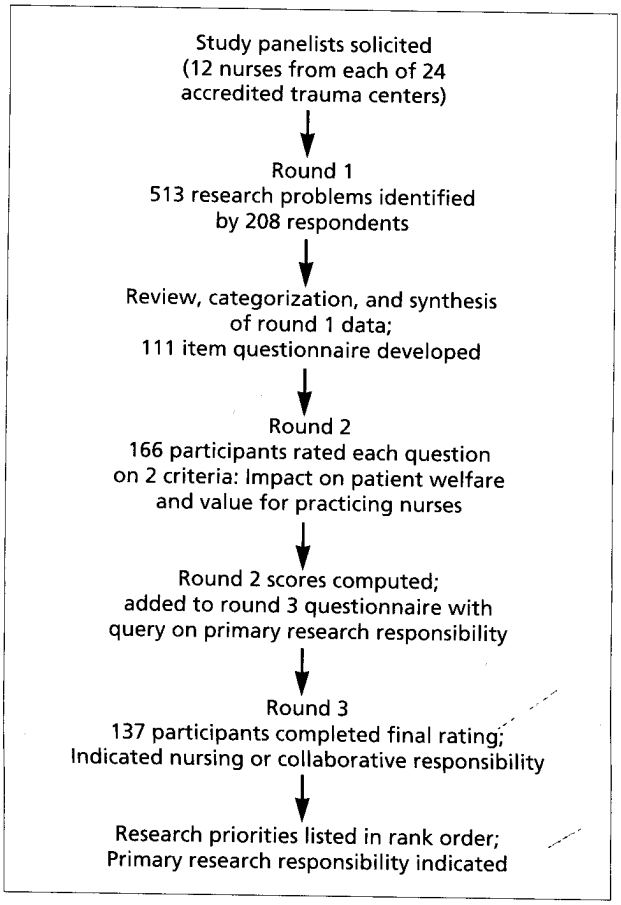
The Delphi technique is a method allowing solicitation and aggregation of informed judgments from a group of experts focusing on a specific issue. Characteristics of the Delphi technique include:

- use of sequential questionnaires constructed to address the issue at hand
- emphasis on achieving consensus

- anonymity among the panel of experts
- multiple opportunities to identify priorities
- statistical analysis of responses
- controlled feedback of responses to panel members[17]

A three-round Delphi technique was used for this study (Figure). Three rounds have been shown to be sufficient, because additional rounds show minimal change in opinion.[18] With the assistance of the Pennsylvania Trauma Systems Foundation, institutional approval to access experienced trauma nurses at each of the 25 accredited trauma centers in Pennsylvania was sought from their appropriate nurse executives. Twenty-four centers, including two exclusively pediatric facilities, agreed to participate. Trauma program coordinators at each center were asked to identify 12 nurses in their facilities with expertise in trauma nursing. This number provided for the inclusion of at least 1 nurse in each phase of trauma care as well as several who had responsibilities across the trauma continuum such as trauma program coordinators, educators, and administrators. Trauma program coordinators were asked to include nurses who worked in prehospital, emergency, perioperative, critical care, medical-surgical, and rehabilitation areas. The coordinators distributed round 1 materials to each of these prospective Delphi panelists.

Study design algorithm



Round 1 consisted of a cover letter explaining the study to potential respondents and soliciting their consent to participate in all three rounds, a demographic data sheet, and the round 1 questionnaire, which included the definition of nursing research used in this study. For the purposes of this study, nursing research was defined as "the systematic inquiry into the phenomena of interest in nursing science, namely, the adaptation of individuals and groups to actual or potential health problems, the environments that influence health in humans, and the therapeutic interventions that affect the consequences of illness and promote health."[19] Each participant was asked to submit three or more questions considered to be research priorities with potential impact on the welfare of trauma patients or of value for practicing trauma nurses.

A total of 513 questions or problems for nursing research were generated by 208 respondents. Four experts in trauma nursing, including two clinical nurse specialists and two faculty coordinators of graduate level trauma programs, all with extensive trauma care experience, reviewed each question. Through a process of content analysis, the questions were categorized into predominant themes. Major themes included: interventions and treatments (n=123), complications and sequelae (n=71), and nursing issues (n=61). Additional themes also emerged as indicated in Table 1. After synthesizing and rewording research problems that were similar, the experts reduced the researchable questions to 111. These questions were randomly ordered for use in the round 2 and 3 questionnaires.

The round 2 questionnaire was sent to the 208 nurses who had completed round 1. In this round, nurses were asked to rate each question on two criteria. Using a Likert-type scale of 1 to 7 (1=low and 7=high), respondents were asked to indicate a question's impact on patient welfare, that is, how important it would be to study this question in regard to potential contribution to trauma patient outcomes. Respondents were asked to use a similar scale to rate each question on its value for practicing nurses, that is, would illumination of this topic through research improve the nurse's effectiveness and quality of practice. Of the round 1 respondents, 80% completed the round 2 questionnaire (n=166). Median and mean scores and rank order were computed for every question on each of the two criteria.

The round 3 questionnaire listed the same 111 research questions as the round 2 questionnaire. Two

additional pieces of information were provided for the respondents' consideration: the group median rating for each question from round 2 and the individual respondent's own rating of each question from round 2. The respondents were again asked to reflect on each question and to rate each of the 111 research questions on impact on patient welfare and value for practicing nurses, in the same manner as in round 2. In addition, on this round a third question was posed: Should nursing take primary responsibility for research on the question or should it be a collaborative effort with other members of the healthcare team? Finally, respondents were asked to comment about any research questions about which they had strong feelings. Of the round 2 respondents (n=137), 83% completed the round 3 questionnaire. A mean score was calculated for each research question and a rank order was determined.

Table 1 Themes resulting from round 1 research problems (N = 513)

Theme	n*	%
Interventions/treatments Varied (97) Airway, breathing, circulation/ resuscitation (15) Nutrition (11)	123	24
Complications/sequelae Varied (33) Pain (24) Infection (14)	71	14
Nursing issues Nurses (31) Nursing management/ administration (30)	61	12
Nursing process	27	5
Psychosocial and family	27	5
Trauma systems/outcomes/ team communication	26	5
Rehabilitation	24	5
Trauma prevention	21	4
Education of care providers	19	4
Substance abuse	16	3
Patient/family education and communication	15	3
Pediatric issues	14	3
Emergency medical system/ prehospital care	11	2
Other	58	11

* Indicates number of research ideas identified by round 1 respondents that related to the theme.

Results

Sample Characteristics

Final data analysis included the 137 nurses who responded to all three rounds (66% of round 1 respondents). Sample demographics are presented in Table 2. The panel ranged in age from 22 to 58 years (mean, 35 years). Overall the sample was highly experienced, with a mean of 13 years of nursing experience of which more than 8 years was in trauma nursing. The expertise of the panelists was further supported by the fact that the majority held certifications relevant to their

Table 2 Demographic characteristics of Delphi panelists who participated in all three rounds (N = 137)

Characteristics	n	%*
Gender		
Female	125	91
Male	10	7
No response	2	2
Age range (years)		
22-29	24	18
30-39	74	54
40-49	25	18
50-58	6	4
No response	8	6
Highest degree held		
Baccalaureate	83	61
Master's	39	28
Doctorate	1	1
No response	14	10
Experience in nursing		
2 - 5 years	16	12
6 - 10 years	33	24
11 - 15 years	49	36
16 - 20 years	16	12
21 - 25 years	14	10
26 or more years	7	5
No response	2	2
Experience in trauma nursing		
1 - 5 years	52	38
6 - 10 years	44	32
11 - 15 years	29	21
16 or more years	10	7
No response	2	2

* May add to more than 100% due to rounding.

specialty and indicated membership in professional organizations. Most (60%) indicated a bachelor's as their highest degree, whereas 28% were master's-prepared.

The employment profile (Table 3) demonstrates that most respondents were employed in critical care units (39%) and emergency departments (28%). Other respondents worked in prehospital, perioperative, medical-surgical, or rehabilitation units or had responsibilities for trauma patients throughout the continuum of care (eg, trauma program coordinators). Most respondents were staff nurses (39%), with nurse managers, trauma coordinators, clinical specialists, and educators comprising most of the remainder of the sample. There were nearly equal numbers of panelists from regional resource (Level I) and regional (Level II) centers. Only a few respondents were employed by pediatric regional centers (Table 2).

Research Priorities

On a 7-point scale, nine questions rated for impact on patient welfare received a mean score of 6.0 or greater. Two questions received mean scores greater than 6.0 when rated for value for practicing nurses. Nine questions ranked within the top 20 for value for impact on patient welfare as well as value for practicing nurses. These are noted with asterisks on Tables 4 and 5.

Regarding "Impact on Patient Welfare," the 20 questions receiving the highest priorities are listed in Table 4. Each question is listed with its means and rank order for rounds 2 and 3. As indicated, priorities changed over time as consensus developed. In addition, Table 4 lists the percentage of nurses who indicated that nurses should take primary responsibility for research on the question, as opposed to sharing the research responsibility with a collaborative health team.

These priorities reflect nursing's biopsychosocial orientation and focus on human responses to actual and potential health problems. Many of the top priorities focus on the prevention or management of complications following injury. Those concerned with airway management (questions 19, 3, 36, 94, 86) are predominant. Problems unique to the head-injured population are also identified in the top 20 priorities (questions 36, 40, 84, 70). Other top priorities focus on psychological needs including lifestyle changes and pain management (questions 2, 16, 47, 28, 1, 53, 39). Social concerns related to both family and society also were among the most highly ranked priorities (questions 12, 33).

Three themes emerged in the priorities rated for value for practicing nurses (Table 5). These themes centered on professional and patient issues. Professional issues included education, the stresses of trauma nursing, and self-protection (questions 4, 20, 51, 8, 46). Within the patient issues, the primary focus was on interventions to prevent or manage complications and sequelae of trauma (questions 19, 3, 36, 70, 102, 34, 40, 77, 101, 53). Psychosocial responses of patients and families to the traumatic event also ranked in the top 20 priorities (questions 16, 28, 21, 106).

Table 3 Employment characteristics of Delphi panelists who participated in all three rounds (N = 137)

Characteristics	n	%*
Current area of employment †		
Prehospital	16	12
Emergency department	38	28
Perioperative	23	17
Critical care	53	39
Medical-surgical	28	20
Rehabilitation	6	4
Other††	35	26
Current position†		
Staff nurse	53	39
Manager	35	26
Trauma coordinator	18	13
Clinical specialist	14	10
Educator	13	10
Other	10	7
Trauma center designation		
Level I	63	46
Level II	61	45
Pediatric	8	6
No response	5	4
Certifications†		
ACLS	70	51
CCRN	48	35
CEN	31	23
PHTLS	20	15
ATLS	15	11
EMT	9	7
Paramedic	7	5
CNRN	7	5
Other	50	36
Professional memberships†		
AACN	54	39
ENA	32	23
ANA	14	10
AANN	11	8
Society of Trauma Nurses	11	8
Other	47	34

* May add to more than 100% due to rounding.
† May include more than one response.
†† Includes respondents who may work throughout the trauma continuum, eg, trauma coordinators, clinical nurse specialists, educators.

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n	%*
16	12
38	28
23	17
53	39
28	20
6	4
35	26
53	39
35	26
18	13
14	10
13	10
10	7
63	46
61	45
8	6
5	4
70	51
48	35
31	23
20	15
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9	7
7	5
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Table 4 Trauma nursing research priorities: impact on patient welfare (N = 137)

No.	Question	Round 2 Rank	Round 2 Mean score (SD)	Round 3 Rank	Round 3 Mean score (SD)	% Nursing responsibility
*19.	What are the most effective nursing interventions in the prevention of pulmonary and circulatory complications in trauma patients?	2	6.13 (1.02)	1	6.17 (.74)	84
*3.	What are the most effective methods for preventing aspiration in the trauma patient during the postoperative phase?	12	5.78 (1.21)	2	6.16 (.50)	58
2.	What psychological and lifestyle changes result from traumatic injury?	1	6.17 (.89)	3	6.15 (.78)	11
*34.	What is the effect of early mobilization on the incidence of complications and length of stay in trauma patients?	3	6.04 (.93)	4	6.13 (.65)	41
*36.	What are the effects of preoxygenation during suctioning on cerebral perfusion pressure and intracranial pressure in the head-injured patient?	8	5.87 (1.13)	5	6.09 (.72)	54
*16.	What motivates trauma patients to participate in their care and rehabilitation?	4	5.99 (1.02)	6	6.05 (.79)	39
47.	Is pain managed effectively in the pediatric trauma patient?	7	5.89 (1.08)	7	6.04 (.87)	45
48.	What is the relationship of early rehabilitation to patient outcomes?	4	5.99 (1.06)	8	6.02 (.86)	18
94.	What are the most effective techniques for airway management in patients with facial trauma and obstructed airway in the prehospital setting?	6	5.91 (1.26)	9	6.00 (1.16)	13
*28.	What are effective strategies to meet the emotional needs of pediatric trauma patients?	14	5.76 (1.09)	10	5.98 (.74)	42
1.	What are the child's perceptions and the psychological effects of traumatic injury and related care?	9	5.83 (1.11)	11	5.97 (.75)	21
12.	What is the effect of traumatic injury of a family member on the trauma patient's family and significant others?	14	5.76 (1.24)	12	5.96 (.66)	32
*40.	What is the best method for hyperventilating the head-injured patient prior to suctioning?	22	5.57 (1.30)	13	5.94 (.95)	59
*53.	What are effective methods for pain management in trauma patients? (related to pain control, mental status, and length of stay)	12	5.78 (1.09)	14	5.93 (.85)	40
33.	What is the impact of lack of funding for trauma centers on patient care?	30	5.48 (1.51)	15	5.92 (.97)	9
86.	What oxygenation techniques are most effective during intubation of trauma patients?	20	5.63 (1.31)	15	5.92 (.86)	20
32.	What are the effects of various methods of tube feeding on aspiration, diarrhea, and caloric intake in trauma patients?	16	5.70 (1.16)	15	5.92 (.71)	30
39.	What nursing interventions most effectively enhance the adaptation of the trauma patient to disfiguring injuries?	17	5.69 (1.14)	15	5.92 (.81)	81
84.	What is the effect of early implementation of a coma stimulation program in the acute phase of head injury on patient outcome?	10	5.82 (1.15)	19	5.89 (.85)	31
*70.	What are the most effective nursing interventions to reduce the period of agitation in the head-injured patient?	22	5.57 (1.20)	20	5.89 (.83)	84

* Indicates that question ranked in top 20 priorities for both impact on patient welfare and value for practicing nurses.

Table 5 Trauma nursing research priorities: value for practicing nurses (N=137)

No.	Question	Round 2 Rank	Round 2 Mean score (SD)	Round 3 Rank	Round 3 Mean score (SD)	% Nursing responsibility
*19.	What are the most effective nursing interventions in the prevention of pulmonary and circulatory complications in trauma patients?	1	6.08 (.95)	1	6.12 (.66)	84
*3.	What are the most effective methods for preventing aspiration in the trauma patient during the postoperative phase?	2	5.88 (1.19)	2	6.09 (.90)	58
4.	What are the most effective educational methods to prepare and maintain proficiency in trauma care providers?	5	5.69 (1.13)	3	5.95 (.71)	36
*36.	What are the effects of preoxygenation during suctioning on cerebral perfusion pressure and intracranial pressure in the head-injured patient?	3	5.80 (1.01)	4	5.94 (.77)	54
20.	What are the stresses associated with trauma nursing and how do they affect the trauma nurse throughout the trauma continuum?	11	5.57 (1.30)	5	5.93 (.97)	90
*70.	What are the most effective nursing interventions to reduce the period of agitation in the head-injured patient?	6	5.68 (1.07)	6	5.89 (.78)	84
102.	What nursing strategies are effective in caring for the combative, verbally abusive trauma patient?	4	5.70 (1.16)	7	5.87 (1.03)	79
*16.	What motivates trauma patients to participate in their care and rehabilitation?	17	5.50 (1.16)	8	5.85 (.76)	39
*34.	What is the effect of early mobilization on the incidence of complications and length of stay in trauma patients?	8	5.65 (1.05)	9	5.83 (.79)	41
51.	Do emergency department personnel comply with protocols for universal precautions in the care of trauma patients?	10	5.58 (1.43)	9	5.83 (.98)	32
*40.	What is the best method for hyperventilating the head-injured patient prior to suctioning?	6	5.68 (1.14)	11	5.81 (.93)	59
*28.	What are effective strategies to meet the emotional needs of pediatric trauma patients?	16	5.51 (1.01)	11	5.81 (.72)	42
8.	What is the frequency of encounters of trauma personnel with patients with hepatitis and/or AIDS?	26	5.38 (1.61)	13	5.80 (1.24)	31
77.	What are the best nursing interventions for preventing increased intracranial pressure during suctioning of the head-injured patient?	9	5.59 (1.25)	14	5.79 (1.31)	82
46.	What are the most effective strategies for reducing stress associated with trauma nursing?	13	5.55 (1.31)	15	5.77 (.92)	77
21.	What nursing interventions effectively support families during the crises following traumatic injury of a family member?	21	5.45 (1.05)	16	5.76 (.73)	78
101.	What are the most effective nursing interventions for preventing loss of skin integrity in specific segments of the trauma population (eg, those with immobilization devices)?	11	5.57 (1.14)	16	5.76 (.82)	81
106.	How can nurses be sensitized to the needs of trauma patients and their families?	15	5.52 (1.10)	18	5.74 (.81)	84
26.	Does dictation of nurses' notes during the emergency and acute phases of care improve nursing documentation?	26	5.38 (1.41)	19	5.72 (1.03)	95
*53.	What are effective methods for pain management in trauma patients? (related to pain control, mental status, and length of stay)	18	5.47 (1.10)	20	5.71 (1.31)	40

* Indicates that question ranked in top 20 priorities for both impact on patient welfare and value for practicing nurses.

% Nursing responsibility
84
58
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As can be seen in Tables 4 and 5, the percentage of nurses who believed that nurses should assume primary responsibility for answering a particular research question varies widely, from a low of 9% to a high of 95%. Although the majority of questions ranking highest for impact on patient welfare would appear to benefit from a collaborative, interdisciplinary approach, questions that ranked highest in value for practicing nurses were most commonly identified as falling within the responsibility of independent nursing research.

Discussion

The results of this study demonstrate the wide range of clinical and professional problems that require the attention of nurse researchers interested in trauma care. Furthermore, although trauma nurses indicated that nurses should take primary responsibility for many of the identified research priorities, they believed that some questions would benefit from an interdisciplinary effort.

The problems identified are consistent with the definition of nursing research that guided this study. Problems focusing on "adaptation of individuals and groups to actual or potential health problems, the environments that influence health in humans, and the therapeutic interventions that affect the consequences of illness and promote health"[19] predominate in the research questions generated by study participants. The identified research questions are clearly reflective of the domains of nursing practice as defined in the Social Policy Statement of the American Nurses' Association: "the diagnosis and treatment of human responses to actual or potential health problems."[20]

The priorities identified by this study can guide the development of a theoretical and scientific foundation for trauma nursing. It is important that a body of research be developed that goes beyond isolated studies to comprehensively address the responses and needs of trauma patients. Smeltzer[8] proposed a triphased model of trauma research including: antecedents (factors that precede trauma), the traumatic event and the period immediately afterward, and outcomes (short- and long-term effects of trauma on patients and family members). These phases can serve as an organizing framework for trauma research.

Highly ranked priorities in this Delphi study are particularly relevent to Smeltzer's second phase (the traumatic event).[8] For example, Smeltzer noted that there is evidence that a child's psychological and emotional responses to stress differ from those of adults. Delphi study participants ranked as high priority questions in the category related to patient welfare, as well as those that related to the psychological effects of trauma on children and on their emotional needs (questions 28, 1).

Beginning with a study by Mitchell and Mauss[21] in 1978, a body of nursing research has been developing in the area of neurologic trauma. However, as noted by Smeltzer,[8] fewer studies have been conducted by nurses focusing on patients with nonneurologic trauma. In this Delphi study, while neurologic problems ranked high, the top concerns are in the area of pulmonary and circulatory complications of trauma. This is consistent with the focus of the top four clinical research priorities issued by the American Association of Critical-Care Nurses that also focus on pulmonary and cardiovascular problems.[5] Studies focusing on pulmonary and circulatory complications[22-24] have been conducted on other populations such as cardiac surgery patients and can provide methodologic models for similar studies in trauma.

The third stage of Smeltzer's[8] model focused on short- and long-term outcomes. Delphi respondents identified four questions in the top 20 priorities specifically related to outcomes. For example, question 2, What are the psychological and lifestyle changes resulting from traumatic injury? ranked third in impact on patient welfare. Three additional questions relating to short- and long-term outcomes (questions 48, 39, 84) are included as research priorities.

None of the research priorities in this study focused on the antecedent phase of trauma. Of the entire 111 questions, only two addressed trauma prevention, which could reflect the fact that all of the Delphi panelists were employed by tertiary care facilities, with emphasis on acute care rather than on health promotion. Furthermore, this finding may reflect limited awareness and support of the involvement of nurses in trauma prevention. However, beginning work in this area has been reported by Bueno et al,[25] who noted "the need for further investigation of the factors influencing risk behaviors in trauma victims and the need for research supporting the development of interventions to prevent future injuries."

Although trauma research has focused on the physiologic aspects of trauma care, research priorities identified by the Delphi respondents extended beyond physiology. A number of top priority questions focus on issues such as lifestyle, adaptation to injury, family concerns, and emotional responses, reflecting nursing's holistic perspective (questions 2, 16, 28, 1, 12, 39, 21, 106).

Research questions that assume priority in the value for practicing nurses focus on professional issues. As the Delphi panelists indicated, there is a need for research on important concerns with implications

for trauma nurse recruitment and retention. The stress of trauma nursing is an obvious theme in the priorities of value to practicing nurses. Some of these stresses include occupational exposure to infectious disease, dealing with abusive or combative patients, and maintaining proficiency in a trauma care unit (questions 4, 20, 102, 8, 46).

Limitations

Findings of this study are limited to responses of trauma nurses employed by accredited trauma centers in one region of the United States. Research priorities of nurses who work in other geographic regions or who care for trauma patients in other settings may differ from the findings reported here. However, Delphi respondents represented trauma centers throughout the Commonwealth of Pennsylvania. Trauma centers within this state care for ethnically and culturally diverse populations, representing all socioeconomic strata, and are located in both urban and rural settings. Also, the high response rate, coupled with the high experience level of Delphi panelists, lends credence to the findings of the study. Replication of this study using a national sample would provide a broader representation of trauma nurses and might yield additional research questions and/or different priorities.

Conclusions

The results of this study make explicit research priorities of interest to the emerging specialty of trauma nursing. Experienced nurses identified and reached consensus on compelling, clinical research problems in trauma care. Nurses with research skills are prepared to answer these questions and develop a theoretical base for trauma nursing. Through the identification of these research priorities, the first step in developing a scientific body of knowledge to support the nursing process in trauma care has been taken. Together, experienced clinicians and researchers can build programs of research in trauma care.

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