CHAPTER FOUR

4.0 DATA ANALYSIS AND DISCUSSION OF RESULTS

Data analysis entails the processes through which the raw data obtained during data collection is reduced to an understandable format so it can be displayed in an organized manner for analysis and discussion.

4.1 Introduction

Through an action research process data were collected in four phases that included both qualitative and quantitative methods. The process involved a group of expert emergency nurses who utilized their expert knowledge, skills and attitudes to explore and describe the phenomena being studied. The information obtained from this group was sent to the rest of the emergency nurse population for validation and verification. The data were weighted to provide rating scales for the items identified in the instruments hereafter referred to as the SG Emergency Nursing Instruments (Tables 4.15 and 4,16). The information gathered was reduced, organized and with the assistance of a statistician (throughout all the phases of the study), the data were analysed and an instrument was developed. Data analysis for each phase will be discussed.

4.2 Approach to Data Analysis

The approach to data analysis was influenced and driven by the purpose of the study to explore and describe the role of the emergency nurse in the pre-hospital environment and the emergency room. In selecting the total emergency nurse population it was necessary to exclude other health care professionals, as the roles investigated are specific to the practice of the emergency nurse. The study did not include the perceptions of other health care professionals but this does not negate their importance as part of the emergency care team.

It is however, imperative that emergency nurses dictate the course that their practice must take or other health care professionals will do so to the detriment of the emergency nurses' practice. The important health care professionals include the medical practitioners working in the emergency care environment, emergency medical technicians and paramedics, as their roles overlap those of the emergency nurse. The role of management at all levels should not be underestimated as their decisions can have an influence on the implementation of this emergency nurse's practice.

Emergency nurses, for this research, were grouped as follows:

- Expert focus group to obtain expert opinions from which to identify, analyse and clarify the roles of the emergency nurse specialist
- Emergency nurse population whose knowledge, skills and experiences was required for validation and verification of the roles identified by the expert focus group

The action research process was undertaken using a four-phased approach as follows:

4.2.1 Phase One: Expert Focus group interview (role clarification)

During this phase the expert focus group comprising nine (n = 9) participants, identified, analyzed and clarified the expected roles of the emergency nurse in both the pre-hospital environment and the emergency room. Descriptive statistics of the demographic data of the expert focus group were obtained to indicate the level of expertise of this group (see Figure 4.2, 4.3 and Table 4.1). Consensus data were derived by the end of this phase.

The first step was to establish whether the group accepted in principle that the environment in which the emergency nurse should practice included the pre-hospital and emergency room as part of the emergency care cycle (milieu).

The second step was the use of the concepts taken from the American ENA's Scope of Practice as a starting point.

The third step was the analysis, clarification and confirmation of the main items for both the pre-hospital environment and the emergency room. The study participants were divided into three sub-groups of three each so they could brainstorm each of the main items to identify what they regarded as the roles of this nurse.

The fourth step was the identification, analysis and clarification of the sub-items for each of the main-items in the same manner as above. The study participants were divided as above into three sub-groups who brainstormed each of the main-items to identify what they regarded as the roles (sub-items) of the emergency nurse according to the main-items. The sub-groups came together to discuss the identified sub-items until consensus was reached about all the sub-items. These were identified for both the pre-hospital environment and emergency room. As numerous items were identified analysis, clarification and grouping were needed.

These main and sub-items pertain to the roles of the emergency nurse.

4.2.2 Phase Two: Weighting of main and sub-items and competency rating

The purpose of this phase was to attach a weight to each main and sub-item developed during the Phase One, in order to identify its relative importance. Eight participants were involved, as the ninth member was absent. This **provided a content validity rating to the items for relevance,** as content validity is the determination of content relevance of the items of an instrument.

The first step in Phase Two was for the expert focus group to do a comparative weighting of the main and sub-items by using a VAS. According to Crawford & Williams

(1985:388), the entities $\{Mi_1, Mi_2,\ldots Mi_8\}$ are in some sense comparable and used in planning to achieve some goal and the entities have varying degrees of some common value. An important application of the ratio scale is in the study of hierarchies where ratio scales for various levels can be combined multiplicatively to give a view of the entire hierarchy. A ratio scale $(u_1, u_2,\ldots u_n)$, $u_i > 0$, for objects $E_1, E_2,\ldots, E_n$ exists but is not known and $a_y, I,j,-1,2,\ldots,n$ are subjective estimates of u_i/u_j made by a judge. It is assumed that $a_{ii} = 1$ for each i, and $a_{ji} = 1/a_{ii}$. The matrix A- $[a_u]$ of subjective pair wise comparisons is a "Judgment Matrix".

The study participants were required to estimate the relative importance of one item versus another in a pair-wise linear fashion where item weights *Wi* were estimated by the experts for both the main-items (Mi) and the sub-items (si). For example, when main-item *i* (the scientific nursing process) was compared with main-item *j* (emergency preparedness) the weights *Wi* and *Wj* followed as the distance on the VAS of 100mm (10cm) from zero to the mark on the VAS and the distance from this mark to 10cm as shown in **Figure 4.1** below.

Scientific nursing process versus Emergency preparedness

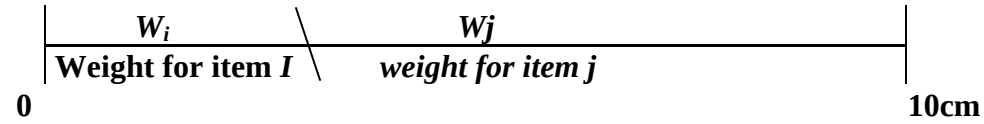

Figure 4.1: Example of how weights were assigned to main-items

The second step in Phase Two was to do a competency rating by using a VAS.

In order to develop the SG Emergency Nursing Instrument it was necessary to identify what the expert group felt about the level of competency. Initially the development of a

Likert Scale was requested with four or five levels ranging from not competent to highly competent. However, the expert focus group decided that this should not be done as the emergency nurse is either not competent, component or highly component. They were then requested to measure, through the use of the VAS, at what level they felt the emergency nurse could be regarded as competent, if not component = 0 and highly component = 1.

4.2.3 Phase Three: Testing, validation and verification of Document 1

A questionnaire was developed and sent out to the whole accessible population of registered or certified Trauma and Emergency nurses in South Africa for validation and verification of the main and sub-items identified by the focus group. They were given an opportunity to identify other roles, which they felt should have been included. A response rate of 22.59% was used as concurrent analysis indicated a high level of validity of the data identified during **Phase One**.

Descriptive, total and comparative statistics were derived from the questionnaire results, to compare the responses of agreement versus disagreement. Significance testing through standard deviations was calculated on the degree of variation from the mean for each construct (see Table 4.11 and Figure 4.5).

4.2.4 Phase Four: Development of the Instrument

The purpose of this phase was to develop an instrument out of the information gathered during Phase One, Two and Three.

The first step was the development of an instrument that could be used to influence policy formation regarding for example, a Scope of Practice for Emergency nurses

The second step was to formulate an instrument that could be used for education, training and evaluation of the emergency nurse. It required the weighting of all the roles and the competency rating of Phase Two.

The main-items and sub-items weighted during Phase One were subjected to a statistical methodology referred to as “Modeling of Human Judgment”. A Judgment Matrix modeling for main-item and sub-item weights using the general linear model was calculated. The weights are standardized values of the co-efficient for the main-items and sub-items in the general model. Since the logarithmic value of the relative importance of item *i* relative to item *j* was modeled, the latter weights followed by exponentiation of the co-efficient (Crawford & Williams, 1985:387).

According to Crawford and Williams (1985:389) the study of interactions among various levels of a hierarchy depends on the assessments of ranked importance of objects at each level relative to objects in the level above, where the building blocks are the ratio scales measuring the relative importance of objects at a given level.

4.3 Results and Findings

Results and findings are presented according to the four phases of the action research process.

4.3.1 Phase One: Expert focus group interview (role clarification)

Phase One consisted of an expert focus group interview where a group of expert emergency nurses reached consensus regarding the roles of the emergency nurse. The results obtained are discussed below.

4.3.1.1 Demographic data of the expert focus group:

The expert focus group comprised nine (n = 9) participants. Below is a synopsis of their demographic data.

Age group:

Five participants were in the 30-39 year old group; two in the 40-49 year old group and two in the 50-60 year old group as seen in **Figure 4.2** below. The largest number was in the 30-35 year old group who also had adequate experience in clinical emergency nursing and formal education.

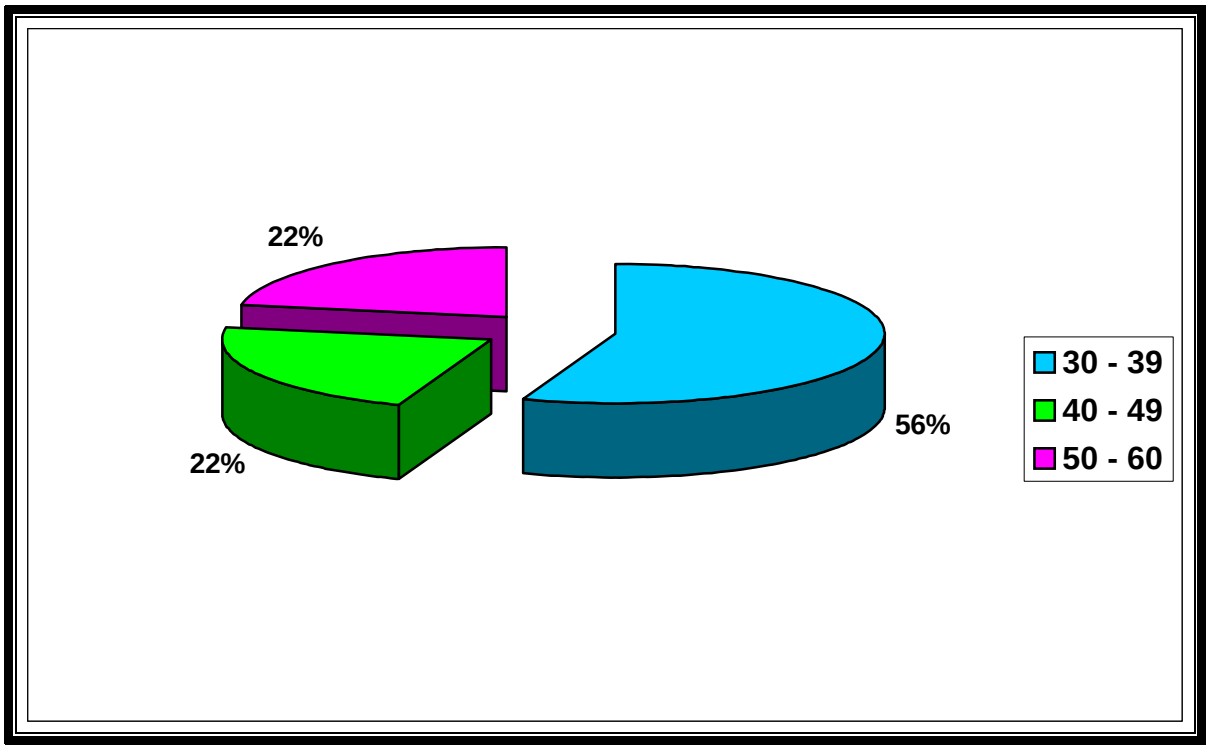

Figure 4.2: Percentage of experts per age group

Qualifications of the expert focus group:

Below is a list of the multiple qualifications of the focus group, which indicates the expertise they could bring to the research. See **Table 4.1**

Table 4.1: Qualifications of the expert focus group

Qualifications	Total
RNs' and RMs'	All
Diploma in Trauma and Emergency	5
Certificate in Trauma and Emergency	2
MA (CUR)	2
Diploma in Critical Care	5
B Soc Sc (Psyc)	3
B (CUR)/ BA	5
D Litt et Phil	1
AEA	2
BAA	2
Diploma in Paediatrics	1
Diploma in Theatre Nursing	2
Aviation medicine	3
Nursing education	6
Nursing administration	4
Multiple short courses	all

Average Educational experience in Emergency Health Care

The expert emergency nurse participants had a mean of 6 years of clinical teaching experience; 7.6 years of formal relevant educational experience and 2.3 years of pre-hospital educational experience within emergency health. See **Figure 4.3** below.

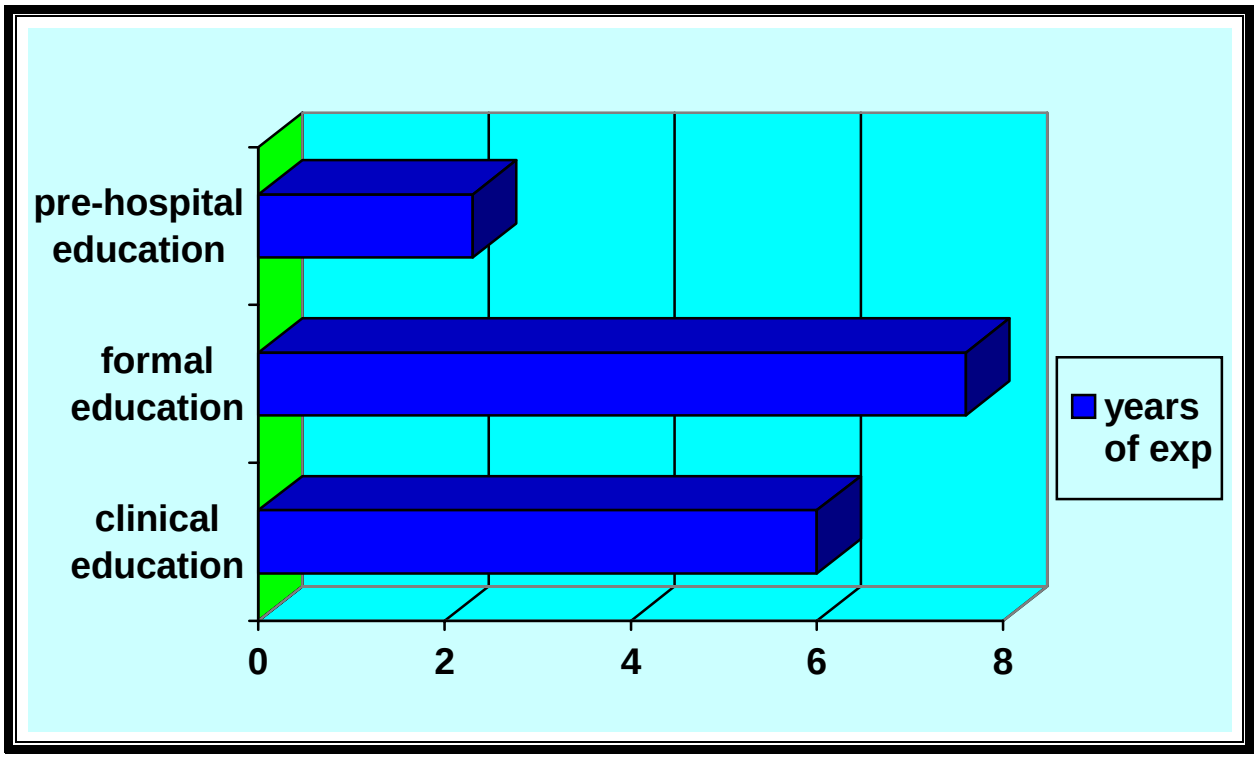

Figure 4.3: Average educational experience in emergency health care

This group contained a vast level of experience and qualifications despite having a small emergency nurse population in South Africa. The fact that they were also involved in pre-hospital emergency education, increased their ability to analyse the role of the nurse within that environment.

4.3.1.2 The first step

The expert focus group accepted in principle that the environment in which the emergency nurse should practice included the pre-hospital and emergency room as part of the emergency care cycle (milieu). This was **accepted unanimously,** although deficiencies experienced by this emergency nurse in efforts to meet the objectives in the pre-hospital environment were found to be a limiting factor.

4.3.1.3 The second step

It was **agreed that the concepts taken from the American Emergency Nurses Association Scope of Practice would be used as a starting point for discussion**. After analysis and discussion of these concepts one item was added, entitled: Prevention, Promotion and Rehabilitation. This was decided upon as health care promotion, prevention and rehabilitation commences in the pre-hospital environment and continues throughout all the phases of emergency health care.

4.3.1.4 The third step

The first day of the expert focus group interview was devoted to discussion and clarification of the emergency nurses' role. The discussions elicited valuable argument and points for consideration. These are included as they enhance the richness and depth of the findings.

The expert focus group reached consensus regarding the "**main-items**" for the pre-hospital environment and emergency room. These are:

1. The Scientific Nursing Process,
2. Emergency Preparedness,
3. Prioritizations,
4. Resuscitation,
5. Stabilization,
6. Crisis Intervention,
7. Prioritization of care in an uncontrolled environment,
8. Prevention, promotion and rehabilitation.

4.3.1.5 The fourth step

The expert focus group reached consensus on all the subcategories of the main-items (M) noted herewith as **sub-items** for both the pre-hospital environment and the emergency room. These are shown in **Table 4.2** below and formed **Document 1**:

Table 4.2: Document 1. Consensus agreed main-items (M) and sub-items (s)

M.1 Scientific Nursing Process		
Pre-hospital		
	Sub-item 1	Primary and secondary assessment
	Sub-item 2	Planning (protocol based)
	Sub-item 3	Management (protocol based)
	Sub-item 4	Continuous evaluation
Emergency Room		
	Sub-item 1	Directed primary and secondary assessment
	Sub-item 2	Planning (definitive, advanced, supportive)
	Sub-item 3	Management (definitive, advanced, supportive)
	Sub-item 4	Continuous evaluation
M.2 Emergency preparedness		
Pre-hospital		
	Sub-item 1	Availability of equipment (knowledge and skills of its mechanics)
	Sub-item 2	Individual knowledge base and skills of:
		• primary and secondary survey
		• advanced life support with / without technical support
		• considerations for patients with special needs
		• application of communication systems
		• decontamination
Emergency Room		
	Sub-item 1	Availability of equipment (knowledge and skills of its mechanics)
	Sub-item 2	Individual knowledge base / skills
		• primary and secondary survey
		• advanced life support with / without technical support
		• consideration for patients special needs
		• application of communication systems
		• decontamination
M.3 Prioritization		
Pre-hospital		
	Sub-item 1	Triage according to principles
	Sub-item 2	Individual prioritization through use of ALS principles
Emergency Room		
	Sub-item 1	Triage according to the use of principles in a stepped up care
	Sub-item 2	Individual prioritization through use of ALS principles

M.4 Resuscitation		
Pre-hospital		
	Sub-item 1	Ethical considerations
	Sub-item 2	Identification of patients requiring resuscitation
	Sub-item 3	Knowledge, skills and techniques of BLS and ALS
	Sub-item 4	Pharmacological Support
	Sub-item 5	Documentation
Emergency Room		
	Sub-item 1	Ethical considerations
	Sub-item 2	Identification of patients requiring resuscitation
	Sub-item 3	Knowledge, skills and techniques of BLS and ALS
	Sub-item 4	Pharmacological Support
	Sub-item 5	Documentation
M.5 Stabilization		
Pre-hospital		
	Sub-item 1	Safety (self, scene, vehicle, patient)
		• Immobilization
		• Extrication
		• Transportation
		• Pharmacological intervention (ALS protocols and Scope of Practice)
Emergency Room		
	Sub-item 1	Safety (self, environment, patient)
		• Immobilization
		• Transportation
		• Pharmacological intervention (protocol and prescription)
	Sub-item 2	Unpackaging
	Sub-item 3	Assessment and management of minor and major conditions (cardiac and haemodynamic monitoring with appropriate interventions, oxygenation and ventilation)
	Sub-item 4	Referral for specialist care
M.6 Crisis Intervention		
Pre-hospital		
	Sub-item 1	Defusing
	Sub-item 2	Critical incident crisis intervention
	Sub-item 3	Crowd control
	Sub-item 4	Care/ consideration of special “victims”/ needs (rape, child abuse, cultural differences)
Emergency Room		
	Sub-item 1	Defusing
	Sub-item 2	Critical incident crisis intervention

	Sub-item 3	Crowd control
	Sub-item 4	Care/ consideration of special “victims”/ needs (rape, child abuse, cultural differences)
M.7 Prioritization of care in an uncontrolled environment		
Pre-hospital		
	Sub-item 1	Safety
	Sub-item 2	Triage
	Sub-item 3	Disaster management
	Sub-item 4	Preparation for alternative intervention in an austere environment with a lack or failure of resources
	Sub-item 5	Collaboration with experts
	Sub-item 6	Use of forensic medicine principles
Emergency room		
	Sub-item 1	Safety
	Sub-item 2	Triage
	Sub-item 3	Disaster management
	Sub-item 4	Preparation for alternative intervention in an austere environment with a lack or failure of resources
	Sub-item 5	Collaboration with experts
	Sub-item 6	Use of forensic medicine principles
	Sub-item 7	Knowledge of fire-fighting equipment
M.8 Prevention, Promotion and Rehabilitation		
Pre-hospital		
	Sub-item 1	Health education
Emergency room		
	Sub-item 1	Health education

The above-mentioned sub-items are clear and concise. These sub-items can also include a number of items, which the individual nurse educators need to analyze to ensure that the emergency nurse is adequately prepared to meet the needs within that space and time. This allows for flexibility, as emergency nursing is a dynamic speciality that is rendered within a dynamic emergency health care milieu.

Discussion information

The expert focus group identified important factors during their discussion and these could be relevant for the interpretation of the findings mentioned above and for educational considerations of the emergency nurse:

- **Inadequate roadwork experience (time).** Although current curricula adequately cover most aspects of pre-hospital management the time allotted for pre-hospital roadwork clinical experience was not. The possibility of extending the course over two years to meet this outcome was in principle accepted by all in the expert focus group. It was felt that the one-year course is too full and the students would benefit from the extension of time. This is in line with SAQA requirements for registration at level eight (8).
- **The scientific nursing process.** There was extensive and heated debates by the expert focus group around this aspect as much of the immediate emergency interventions are protocol based. Some participants felt that it should be termed the emergency nursing process to indicate the urgency of health care and that the nurse had to respond immediately without time to develop a care plan. However, it was clarified that emergency nursing was not just about the actions which take place during the resuscitation, it extends beyond that time and space where a holistic model of health care necessitates the use of the scientific nursing process. This discussion lead to the inclusion of protocol management. The importance of management according to protocols has to be emphasized as emergency management involves different categories of health care personnel, who are expected to know and implement these protocols in evidence-based practice that has been internationally or nationally accepted. The emergency health care team

who utilizes a protocol-based approach saves time, which is critical to the patients' outcomes.

- **The independent, autonomous functioning of the emergency nurse.** The importance of this role within the South African context was identified, as was the necessity to obtain and/or confirm the necessary legislative support for this emergency nurse to practice. It was felt that the emergency nurse has been functioning at a level that has not been clearly identified by the regulating authority (SANC), which has and continues to create problems in practice. This was necessary to ensure that patients had access to rapid life-saving interventions or those interventions that would improve their health care outcomes where medical support is not immediately available.
- **Pharmacological interventions.** Discussions centred on the emergency nurse's independent functioning in this regard. Resuscitation protocols are available for advanced life support, but whether the nurse can administer these drugs without a physician's direct prescription is unclear. This needs further investigation that should be done outside of this study. The need remains for pharmacological protocols, including all the responsibilities of the emergency nurse regarding the administration and supervision of medication. However the emergency nurses' advocacy role increases as she/he must anticipate and understand the treatment during emergencies.
- **Defusing.** This term needed clarification. It was agreed that emergency nurses are not trained to do crisis intervention neither do they have the time to do it. However they play a vital role in defusing crises and then appropriately referring patients and all relevant others. Although the main-item, crisis intervention was retained, emergency nurses have a limited role in this regard.

- **Underlying knowledge.** The in depth knowledge of all relevant anatomy, physiology, pathophysiology and professional practice aspects are needed to enable the emergency nurse to care for any patient and relevant others, requiring emergency health care are a fundamental requisite throughout all the identified roles.

4.3.2 Phase Two: Weighting of main and sub-items and competency rating

Eight (n = 8) participants were involved in this process. The weighting required that the members estimate the relative importance of one item versus another in a pair wise linear fashion, where the expert emergency nurses for both the main-items and the sub-items did item weights Wi. A competency rating was also done.

4.3.2.1 Weighting of the main-items

For each of the eight (8) main-items identified, 28 pair-wise assessments were possible and done by each member through the use of a VAS of 100mm (10cm). The results of each member's weighting for each main-item are presented in **Table 4.3** below.

The statistical analyses used for the pair wise assessments will be found in Annexure F

Table 4.3: Weighting of the main-items

Participants	1	2	3	4	5	6	7	8	**Mean**
VAS item No.	**Weights as measured on the VAS (cm)**								
1	6.7	5.7	2.5	3.2	2.0	4.7	1.0	9.3	4.39
2	7.0	4.1	2.7	3.1	3.3	4.9	7.8	9.3	5.28
3	7.2	4.1	2.9	3.3	1.1	4.9	0.7	9.4	4.20
4	7.2	4.8	2.7	3.2	2.7	5.0	1.0	9.1	4.46
5	8.0	5.5	2.6	3.1	4.6	4.8	0.9	4.5	4.25
6	8.5	5.2	2.6	3.0	4.6	3.6	1.1	9.7	4.79
7	8.5	4.7	5.0	2.8	4.9	4.7	1.2	2.5	4.29
8	5.5	5.3	5.0	4.5	5.0	4.5	8.2	4.6	5.33
9	5.7	3.9	5.1	4.5	5.0	4.6	8.6	4.8	5.28
10	5.8	4.7	5.3	4.5	5.0	4.7	8.7	4.7	5.43
11	4.9	5.5	5.0	4.6	5.1	6.2	7.8	2.6	5.21
12	5.3	4.2	4.9	4.7	5.2	6.4	4.4	5.2	5.04
13	5.5	5.7	7.3	5.0	5.2	4.9	1.1	7.8	5.31
14	6.0	4.0	5.2	5.2	2.0	4.7	1.5	5.2	4.2
15	5.9	6.3	5.2	5.2	2.0	4.7	7.9	5.5	5.34
16	7.6	6.3	5.3	5.3	7.1	4.7	4.8	1.1	5.26
17	5.5	3.6	5.2	3.5	5.0	5.2	4.7	5.3	4.75
18	5.8	5.1	5.0	4.6	7.4	4.9	4.7	4.2	5.21
19	5.8	6.3	5.1	6.0	7.4	5.0	8.6	5.6	6.23
20	7.2	6.3	5.0	6.0	7.4	6.6	8.6	1.8	6.11
21	4.8	6.5	5.0	5.0	7.0	6.4	8.0	4.9	5.95
22	5.2	6.4	5.3	5.7	7.4	6.6	8.2	4.9	6.21
23	5.5	5.2	5.4	5.0	7.4	6.8	8.2	2.6	5.76
24	5.7	4.1	5.1	4.8	5.1	6.9	8.3	7.7	5.96
25	5.7	5.4	5.3	5.6	6.2	5.6	8.4	4.5	5.84
26	3.7	4.0	5.2	5.8	2.1	3.8	5.1	7.8	4.69
27	4.0	3.9	5.4	5.0	6.9	4.2	5.4	4.9	4.96
28	7.4	6.0	5.5	5.1	7.3	5.0	8.3	3.5	6.01

This information was utilized to calculate the scaled weights for the development of the SG Nursing Education Instrument as discussed under Phase Four

4.3.2.2 Weighting of the Sub-items

The sub-items were weighted in the same manner as the main items. There were 95 pair-wise assessments done for the sub-items. Where there was only one sub-item for a main-item no pair-wise assessments could be carried out (three in total). These were for:

- Stabilization in the pre-hospital environment
- Prevention, Promotion and Rehabilitation in the pre-hospital environment
- Prevention, Promotion and Rehabilitation in the emergency room

The sub-item Resources under the Main –item Prioritization was removed after the focus group did the VAS as they decided that resources were generic to all the Main –items.
The statistical analyses used for the pair-wise assessments can be found under Annexure G

The results of each member's weighting for each sub-item are presented in **Tables 4.4 and 4. 5** below.

Table 4.4: Weighting of sub-items for the pre-hospital environment

Participants	1	2	3	4	5	6	7	8	Mean
VAS Item No.	Weights measured on the VAS (mm)								
1. Scientific Nursing Process									
1	7.3	5.1	6.8	8.6	2.1	6.0	4.4	5.1	5.68
2	7.2	5.3	4.2	4.9	8.2	6.1	4.5	4.8	5.65
3	5.3	5.4	5.1	5.1	4.7	4.8	4.5	4.1	4.88
4	5.4	5.4	4.0	1.3	5.1	6.4	4.7	4.9	4.65
5	3.8	5.4	3.8	1.2	8.6	4.9	4.8	4.9	4.68
6	5.7	5.3	2.5	4.8	4.5	5.1	4.8	5.8	4.81
2. Emergency Preparedness									
1	5.2	5.4	2.5	5.0	1.3	0.7	2.7	2.6	3.18
3. Prioritization									
1	5.3	5.3	6.5	5.0	8.4	7.5	4.7	3.7	5.80
2	5.9	4.1	6.0	2.2	1.3	4.5	3.8	3.4	3.90
3	5.6	3.2	4.9	2.1	4.3	4.7	4.0	6.3	4.39
4. Resuscitation									
1	7.1	2.8	4.7	7.7	7.0	1.5	4.4	3.1	4.79
2	3.1	5.0	3.7	1.6	1.9	1.6	4.6	3.3	3.10
3	5.5	5.2	4.8	5.1	4.3	4.8	4.7	3.3	4.71
4	3.1	2.8	5.4	1.7	8.0	4.8	4.6	6.2	4.58
5	2.6	7.1	4.9	1.6	1.5	4.8	4.8	5.0	4.038
6	2.6	7.0	5.0	4.9	4.7	4.8	4.8	6.4	5.03
7	2.7	3.0	6.5	1.9	8.4	5.0	5.4	6.8	4.96
8	5.3	4.9	5.1	7.8	7.8	7.5	4.7	6.1	6.15
9	5.7	3.8	4.7	5.0	5.0	4.9	5.5	6.3	5.11
10	6.9	3.7	5.7	5.1	5.0	5.0	4.9	7.1	5.43
5. Stabilization									
No second option									

6. Crisis Intervention									
1	5.1	1.7	5.1	7.8	1.2	7.4	5.0	6.5	4.98
2	5.8	1.4	5.3	1.9	1.0	7.4	5.0	4.9	4.09
3	6.0	2.0	5.4	4.8	1.1	1.5	4.9	3.6	3.66
4	6.0	1.8	5.8	2.0	8.6	7.5	4.9	3.2	4.98
5	6.3	7.6	5.3	2.0	4.3	1.8	5.0	3.1	4.43
6	6.4	7.7	5.3	7.7	7.4	5.4	4.8	3.9	6.08
7. Prioritization of Care in an Uncontrolled Environment									
1	4.4	1.1	4.9	7.9	8.7	1.7	4.8	6.5	5.00
2	6.0	0.2	5.4	8.0	0.8	4.7	4.8	6.4	4.54
3	4.7	0.2	5.2	8.0	4.5	1.4	4.9	5.1	4.25
4	5.3	4.6	5.7	8.2	2.0	5.1	5.8	5.0	5.21
5	6.9	0.2	6.0	8.4	1.0	7.2	4.9	5.1	4.96
6	4.9	5.7	5.1	4.8	1.1	7.5	5.0	4.9	4.88
7	5.4	1.0	4.9	8.3	8.7	7.5	3.7	4.0	5.438
8	5.7	5.7	5.3	5.0	8.7	7.5	5.9	6.0	6.23
9	5.7	3.7	6.1	8.0	4.4	4.7	5.0	4.7	5.29
10	5.6	2.8	2.6	8.2	8.2	4.9	4.9	6.3	5.44
11	5.0	5.2	5.6	8.2	1.3	7.1	4.9	6.3	5.45
12	5.1	5.3	4.4	8.2	8.7	4.9	4.9	6.5	6.00
13	5.1	7.0	5.4	2.0	1.0	7.4	5.7	5.5	4.89
14	5.2	5.0	6.1	7.9	0.5	1.7	5.0	4.8	4.53
15	5.2	5.4	5.1	8.0	0.8	1.9	5.4	4.3	4.51
8. Prevention, Promotion and Rehabilitation									
No second option									

Table 4.5: Weighting of sub-items for the emergency room

Participants	1	2	3	4	5	6	7	8	Mean
VAS item No.	Weights measured on the VAS (cm)								
1. Scientific Nursing Process									
1	7.2	5.3	3.7	8.0	2.0	2.8	4.7	5.7	4.93
2	7.2	5.6	3.5	4.7	8.1	3.1	4.6	5.0	5.23
3	5.7	5.1	4.7	5.0	1.8	2.4	4.8	5.8	4.41
4	5.8	5.4	4.9	1.9	2.7	3.0	5.0	4.9	4.20
5	5.0	5.6	4.2	1.6	6.6	2.7	5.0	4.7	4.43
6	3.4	5.9	4.2	5.0	3.5	3.0	5.0	5.9	4.49
2. Emergency Preparedness									
1	5.5	5.5	2.7	5.0	7.4	4.8	2.9	2.6	4.55
3. Prioritization									
1	5.6	5.3	4.0	5.2	1.6	4.9	4.3	2.9	4.23
2	5.7	4.3	5.1	2.2	4.7	5.0	3.7	3.5	4.28
3	5.7	4.0	5.1	2.1	1.8	5.2	3.8	6.7	4.30
4. Resuscitation									
1	5.2	3.2	4.2	5.2	2.0	5.0	4.9	4.0	4.21
2	1.8	4.7	4.7	2.0	8.2	4.7	3.9	3.5	4.19
3	5.3	4.9	4.7	5.2	1.6	1.9	4.9	3.2	3.96
4	3.7	3.5	4.7	1.9	8.0	7.8	4.5	5.8	4.99
5	1.4	6.9	5.0	1.9	8.0	2.0	4.7	5.0	4.36
6	1.6	4.7	5.0	2.0	1.5	4.7	4.8	6.9	3.90
7	1.9	2.9	5.1	2.0	1.5	7.1	4.7	7.3	4.06
8	5.2	5.6	5.2	5.0	8.7	5.0	4.8	6.7	5.78
9	5.4	3.0	5.1	7.8	8.5	7.2	5.8	6.2	6.13
10	5.6	3.3	5.4	2.1	1.0	3.5	4.6	7.2	4.09
5. Stabilization									
1	7.1	5.0	4.7	4.9	9.3	7.5	4.9	6.9	6.295
2	4.9	4.9	4.7	5.0	9.2	2.1	5.7	4.8	5.16
3	6.8	2.1	5.7	4.9	9.1	4.8	5.0	6.7	5.64
4	5.2	6.6	6.0	4.8	9.0	4.9	5.0	3.0	5.56
5	7.9	4.8	6.0	4.7	9.2	5.1	4.9	4.3	5.86

6	5.4	5.0	4.7	5.1	8.2	5.2	4.9	6.2	5.59
6. Crisis Intervention									
1	5.6	1.3	5.1	7.8	1.7	4.8	4.9	3.9	4.395
2	5.7	1.5	4.9	1.8	8.6	5.0	4.9	6.4	4.85
3	5.7	1.7	4.8	5.3	0.8	1.9	5.0	3.0	3.53
4	5.9	1.5	4.6	1.9	9.1	2.7	5.0	6.3	4.63
5	6.2	2.1	4.8	1.8	9.1	2.0	5.0	3.2	4.28
6	6.2	6.8	5.2	8.1	1.0	2.1	5.0	3.4	4.73
7. Prioritization of Care in an Uncontrolled Environment									
1	5.2	0.4	4.5	7.9	8.6	1.7	4.9	6.4	4.95
2	5.9	1.2	4.6	8.1	8.7	8.0	4.8	6.3	5.95
3	5.4	1.2	5.8	8.2	9.0	8.5	4.8	5.7	6.08
4	5.5	0.5	3.5	8.0	0.7	7.5	5.8	5.3	4.60
5	7.2	0.7	4.4	8.2	0.7	5.2	4.9	3.9	4.40
6	5.2	5.0	5.3	5.2	0.6	5.3	4.7	4.7	4.50
7	7.8	2.5	5.5	5.2	4.6	7.5	7.0	5.8	5.745
8	5.4	4.8	5.4	5.3	4.7	4.8	4.7	4.8	4.99
9	5.5	1.5	5.1	8.1	8.7	5.2	4.2	6.2	5.56
10	5.8	5.5	4.2	8.2	0.8	7.7	5.8	6.0	5.50
11	5.8	5.5	4.4	8.2	0.9	5.0	5.3	6.9	5.25
12	6.0	4.0	5.3	8.5	4.6	5.3	7.2	7.5	6.05
13	5.1	3.1	6.1	7.8	8.8	5.3	5.0	6.9	6.01
14	5.1	5.8	3.4	5.2	1.3	5.4	5.0	6.0	4.65
15	5.5	5.4	4.8	8.1	1.5	5.4	6.2	7.0	5.49
16	5.4	2.5	4.3	8.4	8.7	5.4	6.5	8.0	6.15
17	5.2	7.4	5.9	2.0	0.7	5.3	6.6	6.0	4.89
18	5.3	7.0	3.0	5.5	0.8	4.8	6.6	4.2	4.65
19	5.5	7.1	3.5	2.0	0.7	5.0	6.8	8.2	4.85
20	5.9	2.2	5.2	8.2	4.3	5.4	5.0	6.0	5.28
21	6.9	2.6	5.5	7.9	8.4	1.6	6.6	7.4	5.86
22	7.1	3.0	5.2	8.1	0.7	7.7	7.0	7.9	5.84
8. Prevention, Promotion and Rehabilitation									
No second option									

4.3.2.3 Rating of competency

In order to develop the SG Emergency Nursing Instrument it was necessary to identify the level at which the expert focus group rated the level of competency. This had to be rated on a VAS where not competent = 0 and highly competent = 1. Table 4.6 indicates the results of each participants' competency rating.

Table 4.6: Competency rating

Participant	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**TOTAL**
Measurements on the VAS	7.9	5.3	8.2	6.9	6.8	8	8.8	6.1	**58**
Mean									**7.2**
Percentage									**72**

The results according to the VAS indicated the following:

not competent = 0%, competent = 72% and highly competent = 100%

The information regarding the main and sub-item weighting and the competency rating were used to develop the SG Emergency Nursing Instrument (during Phase Four) for use as a policy document and an education and evaluation instrument that will be discussed under Phase Four.

4.3.3 Phase Three: Testing, validation and verification of Document 1

The information gathered during the expert focus group interview, **seen in Table 4.2** was developed into a questionnaire (Annexure E) and sent out to the whole accessible

population of registered or certified Trauma and Emergency Nurses in South Africa. See sample size in **Table 4.7** below.

Table 4.7: Population and Sample size for the questionnaire

	Total population	**Focus group**	**Pilot study**	**Sample for the questionnaire = N**	**Questionnaires returned = n**
Numbers	426	9	1	416	94
Percentage	100	2.11	0.2	97.65	22.59

The emergency nurse population comprised of 426 of which 9 were included in the expert focus group and 1 in the pilot study. Of the 416 questionnaires posted, only 94 were returned. This comprised only 22.59% of the sample but it was acceptable to the statistician owing to the high rate of agreement from the participants, which confirmed the reliability and validity of the findings of the expert focus group (See below).

Results of the questionnaires

Demographic information was obtained, to gain an overview of the characteristics of the participants. This was followed by the questionnaire developed from the information obtained during the focus group interview. Data analysis indicate the following:

4.3.3.1 Demographics

4.3.3.1.1 Age profile of participants to the questionnaire

The largest numbers of participants were 30-39 years old, followed by the 40-49 year old age group, with the lowest being in the 50-60 year old age group. This indicates that the majority of participants were in a mature age group. See Table 4.8 and Figure 4.4 below.

Table 4.8: Frequency distribution of participants according to their age

Age Groups	**Numbers**	**Percentage**
20-29	**14**	**14.89**
30-39	**50**	**53.19**
40-49	**23**	**24.47**
50-60	**6**	**6.39**
No information	**1**	**1.06**
Total	**94**	**100**

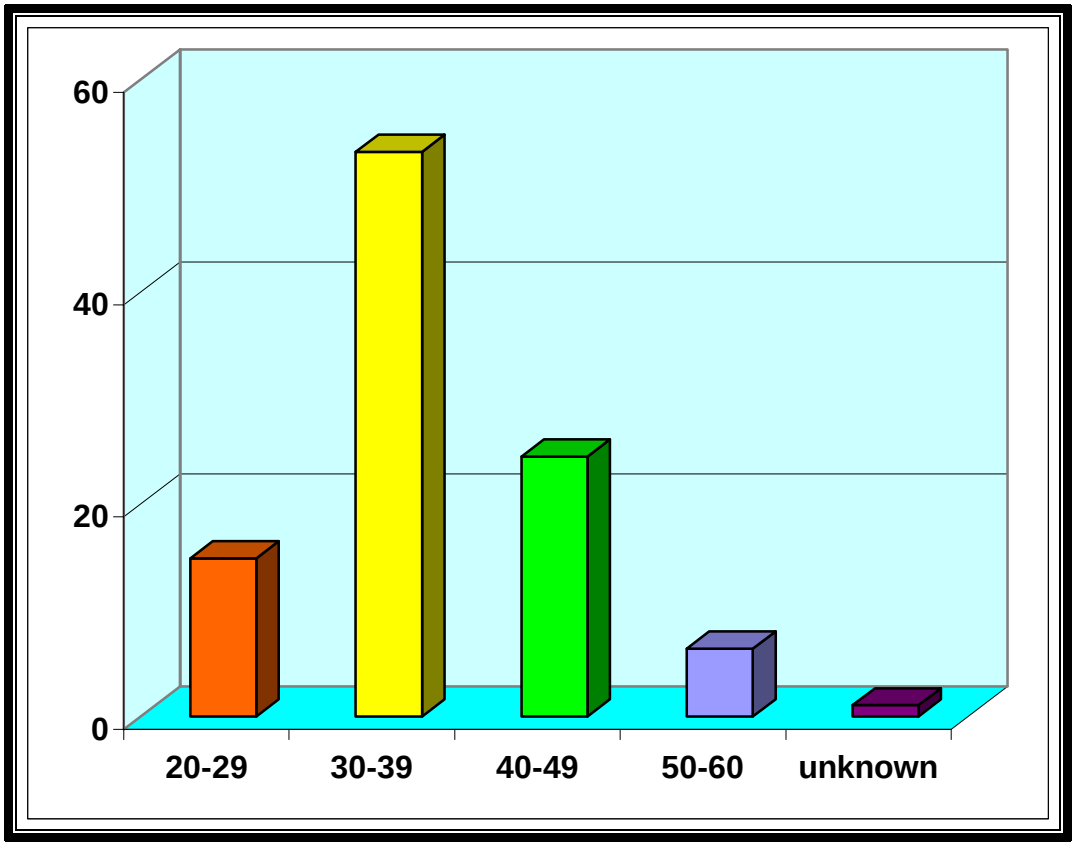

Figure 4.4 Percentage of participants according to age groups

4.3.3.1.2 Qualifications Profile

Each participant was a registered nurse with a certificate, diploma and/or degree in Trauma and Emergency Nursing Science. A list of other concomitant qualifications of the participants follows in **Table 4.9** below.

Table 4.9: Additional qualifications of participants

Qualifications	Numbers
Aviation medicine	2
B CUR	16
B Soc Sc	5
CCA	1
Diploma in Community health nursing	1
Diploma in Critical Care nursing	5
Diploma in Nursing education (besides B CUR)	3
M CUR	1
Diploma in Nephrology nursing	1
Diploma in Nursing management (besides B CUR)	3
Diploma in Occupational health	1
Diploma in Paediatric Nursing science	1
Diploma in Primary health care nursing	2
Total	42

The largest number of additional qualifications was the B CUR degree, of which 16 participants had completed. The above is interesting in view of the fact that in South Africa the nurses with a Critical Care nursing qualification receives an additional

financial allowance as a scarce skill whereas those with a B CUR do not. The numbers who have done the B CUR degree indicates that nurses do want to improve their qualifications but due to logistical factors opt for distance education packages. The small number of those who have done the aviation medicine course is of concern, as this is the emergency nursing speciality that should encourage nurses to qualify in this field. This could be due to a lack of involvement in this field and/or lack of access to training in it. However, the diverse range of additional qualifications did not deter from the high rate of agreement with the expert focus group.

4.3.3.1.3 Profile of years of experience

A profile of the participants indicated the following, which can be seen in **Table 4.10** below:

- 15 participants qualified in the first quarter of 2004 and therefore only had the experience as emergency nurses gained during their training that were counted as nil years from qualification. Their input could be valuable for future planning, but this lack of experience may have influenced their opinions.
- 2 participants qualified in 1991, thus had the most experience of 13 years each.
- 3 participants did not complete the information which was therefore noted as 0 years of experience.
- Their **average was 4.29 years of experience**, which is a fair amount of experience on which to base their comments.

Table 4.10: Profile of participants years of experience

Year completed	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Not recorded	Total
Years of Experience	13	12	11	10	9	8	7	6	5	4	3	2	1	0	?	91
No. of participants	2	1	6	4	4	9	1	5	2	9	9	17	7	15	3	94
Total years of Experience	26	12	66	40	36	72	7	30	10	36	27	34	7	0	?	403
Mean																

4.3.3.2 Participants who agreed and disagreed with the expert focus group

A very small percentage of participants disagreed with the focus group findings (see Table 4.11 below). In total there was a 95.37 % agreement versus a 4.63% disagreement. The median for the participants who agreed equals 96.81% with a mode of 98.94%. The average deviation was 3.19 whilst the standard deviation was 4.33.

Table 4.11: Numbers of participants who agreed and disagreed with the expert focus group

M.1 Scientific Nursing Process	**No. Agreed**	**% Agreed**	**% Dis-agreed**
Pre-hospital Environment			
Primary and secondary assessment	93	**98.94**	1.16
Planning (protocol based)	87	**92.55**	7.45
Management (protocol based)	87	**92.55**	7.45
Continuous evaluation	93	**98.94**	1.16
Emergency Room			
Direct (focused) primary and secondary assessment	92	**97.87**	2.13
Planning (definitive, advanced, supportive)	90	**95.74**	4.26
Management (definitive, advanced, supportive)	92	**97.87**	2.13
Continuous evaluation	93	**98.94**	1.16
M.2 Emergency Preparedness			
Pre-hospital Environment			
Availability of equipment (knowledge of its mechanics)	93	**98.94**	1.16
Individual knowledge base and skills of:	94	**100**	0
Emergency Room			
Availability of equipment (knowledge of its mechanics)	91	**96.81**	3.19
Individual knowledge base and skills of:	91	**96.81**	3.19
M.3 Prioritization:			

Pre-hospital Environment			
Triage according to principles	91	**96.81**	3.19
Individual prioritization through use of ALS principles	91	**96.81**	3.19
Emergency Room			
Triage according to principles	88	**93.62**	6.38
Individual prioritization through use of ALS principles	90	**95.74**	4.26
M.4 Resuscitation:			
Pre-hospital Environment			
Ethical considerations	87	**92.55**	7.45
Identification of patients requiring resuscitation	93	**98.94**	1.16
Knowledge, skills and techniques of BLS and ALS	92	**97.87**	2.13
Pharmacological intervention	89	**94.68**	5.32
Documentation	94	**100**	0
Emergency Room			
Ethical considerations	92	**97.87**	2.13
Identification of patients requiring resuscitation	94	**100**	0
Knowledge, skills and techniques of BLS and ALS	92	**97.87**	2.13
Pharmacological intervention	90	**95.74**	4.26
Documentation	94	**100**	0
M.5 Stabilization:			
Pre-hospital Environment			
Safety (self, scene, vehicles, patients)	93	**98.94**	1.06
Emergency Room			
Safety (self, scene, vehicles, patients)	91	**96.81**	3.19
Unpackaging	93	**98.94**	1.06
Assessment and management of minor and major conditions	93	**98.94**	1.06
Referral for specialist care	84	**89.36**	10.64
M.6 Crisis Intervention			
Pre-hospital Environment			
Defusing	79	**84.04**	15.96
Critical incident crisis intervention	89	**94.68**	5.32
Crowd control	77	**81.91**	18.09

Care/consideration of special "victims"	90	**95.74**	4.26
Emergency Room			
Defusing	85	**90.43**	9.57
Critical incident crisis intervention	90	**95.74**	4.26
Crowd control	79	**84.04**	15.96
Care/consideration of special "victims"	91	**96.81**	3.19
M.7 Prioritization of care in an uncontrolled environment:			
Pre-hospital Environment			
Safety	90	**95.74**	4.26
Triage	90	**95.74**	4.26
Disaster management	89	**94.68**	5.32
Preparation for alternative interventions in an austere environment	86	**91.49**	8.51
Collaboration with experts	89	**94.68**	5.32
Use of forensic medicine principles	92	**97.87**	2.13
Emergency Room			
Safety	93	**98.94**	1.06
Triage	92	**97.87**	2.13
Disaster management	91	**96.81**	3.19
Preparation for alternative interventions in an austere environment	90	**95.74**	4.26
Collaboration with experts	92	**97.87**	2.13
Use of forensic medicine principles	80	**85.11**	14.89
Knowledge of fire fighting equipment	83	**88.30**	11.7
M.8 Prevention, Promotion and Rehabilitation:			
Pre-hospital Environment			
Health education	85	**90.43**	9.57
Emergency Room			
Health education	92	**97.87**	2.13
Totals		**95.37**	**4.63**
Standard Deviation		**4.33**	

The highest numbers of disagreement about a role in the pre-hospital environment are given below. Crowd control = 18.08%. This crowd control is traditionally seen as a role performed by others, whilst the emergency caregiver does direct patient care. However, it remains one of the responsibilities/roles of the emergency caregiver, as validated by a significant percentage of agreements (81.92%) from the respondents. Defusing = 15.96% may be due to the use of a new word (it has always been identified as crisis intervention and it was through the process of concept clarification that the term defusing was used instead). The use of forensic medicine principles (14.8%) could be due to a lack of knowledge in this field, which is now becoming a speciality in its own right. See **Figure 4.5** below.

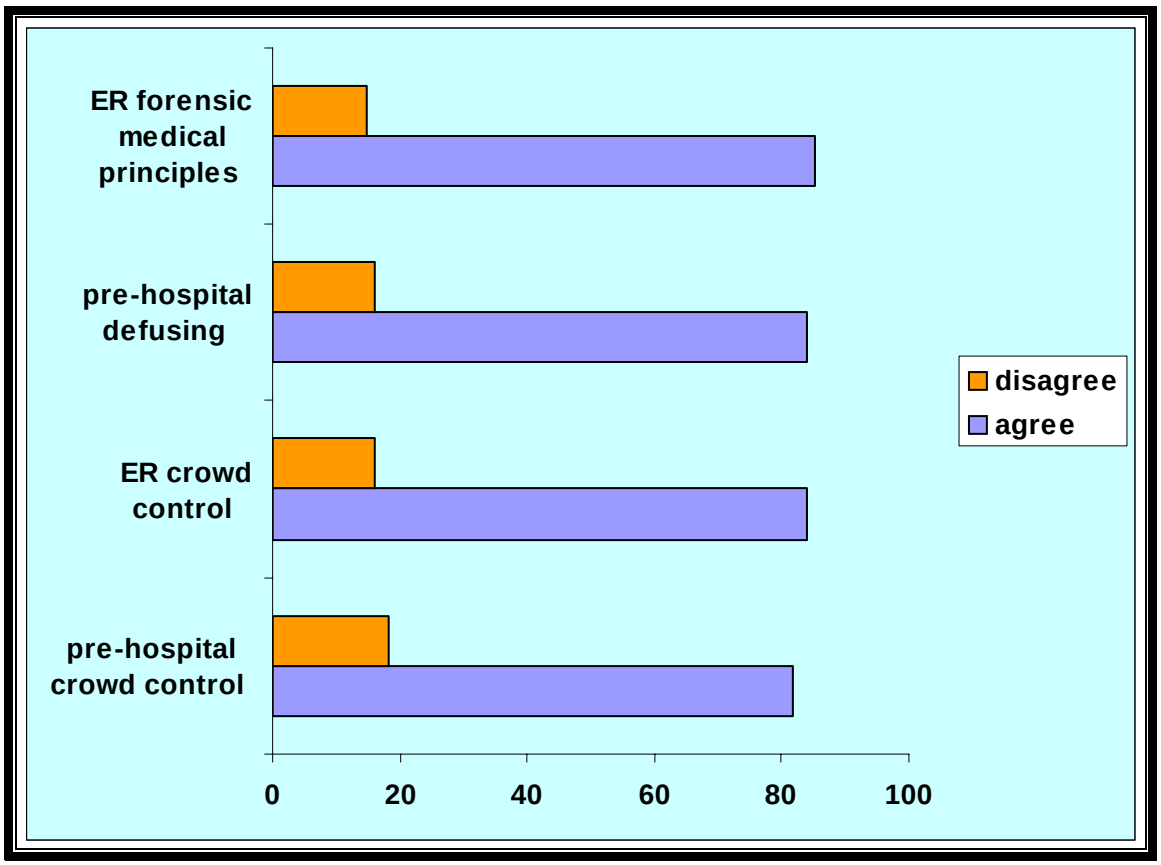

Figure 4.5: Sub-items with the highest numbers of disagreement in relation to agreement.

4.3.3.3 Other items suggested by the participants

The participants suggested a number of sub-items. However, after critical consideration these were incorporated under the sub-items identified by the expert focus group. Some were already mentioned under other sub-items and did not need repetition. Plans were in place to change the original main-items and/or sub-items if necessary and then to re-weight these using the expert focus group. However, the results of the questionnaires eradicated the need to change the original document that was weighted by the expert focus group.

Below is a list of the additional suggestions.

- Transportation by helicopter/ambulance
- Improvisation
- Basic medical rescue
- Emotional support and reassurance
- Triage/sorting
- Ethical considerations
- Use of anti-shock mast suit
- Identification of medico-legal hazards
- Perform specialist care without a medical officer
- Knowledge of internal resources
- Stress management
- Debriefing
- Psychological care
- BLS
- Mechanism of injury
- Resuscitation

- Continuous checking of vital data
- Communication
- Transfer of patients
- Feedback afterwards for learning purposes
- Safety
- Pharmacological interventions based on scope in a critical situation
- Let more experienced personnel take over
- Be aware of different protocols that paramedics follow
- Co-ordination of care
- Advise medical team, EMS and management
- Intubation, ventilation, O_2 therapy, use of equipment
- Care of relatives
- Identification of high risk groups
- Consideration of the constitution, cost and religion

4.3.4 Phase Four: Development of the instrument

4.3.4.1 The first step

The first step for this phase was to formulate an instrument that could be used to influence policy formation, for example, a Scope of Practice for Emergency Nurses. The data gathered at the expert focus group interview that made up the main-items and the sub-items were validated and verified by the accessible emergency nurse population. This information was used to develop the instrument for use in policy formation as seen in **Table 4.12** below.

Table 4.12: Instrument for use for policy formation

Main-item	Sub-item	Pre-hospital	Emergency room
Scientific Nursing Process	1	Primary and secondary assessment	Directed primary and secondary assessment
	2	Planning (protocol based)	Planning (definitive, advanced, supportive)
	3	Management (protocol based)	Management (definitive, advanced, supportive)
	4	Continuous evaluation	Continuous evaluation
Emergency Preparedness	1	Availability of equipment (knowledge and skills of its mechanics)	Availability of equipment (knowledge and skills of its mechanics)
	2	Individual knowledge base and skills of:	Individual knowledge base / skills of:
		• primary and secondary survey	• primary and secondary survey
		• advanced life support with / without technical support	• advanced life support with / without technical support
		• considerations for patients with special needs	• consideration for patients special needs
		• application of communication systems	• application of communication systems
		• decontamination	• decontamination
Prioritization	1	Triage according to principles	Triage according to the use of principles in stepped up care
	2	Individual prioritization through use of ALS principles	Individual prioritization through use of ALS principles

Resuscitation	1	Ethical considerations	Ethical considerations
	2	Identification of patients requiring resuscitation	Identification of patients requiring resuscitation
	3	Knowledge, skills and techniques of BLS and ALS	Knowledge, skills and techniques of BLS and ALS
	4	Pharmacological Support	Pharmacological Support
	5	Documentation	Documentation
Stabilization	1	Safety (self, scene, vehicle, patient) • Immobilization • Extrication • Transportation • Pharmacological intervention (ALS protocols and Scope of Practice)	Safety (self, environment, patient) • Immobilization • Extrication • Transportation • Pharmacological intervention (protocol and prescription)
	2		Unpackaging
	3		Assessment and management of minor and major conditions (cardiac and haemodynamic monitoring with appropriate interventions, oxygenation and ventilation)
	4		Referral for specialist care
Crisis Intervention	1	Defusing	Defusing
	2	Critical incident crisis intervention	Critical incident crisis intervention

	3	Crowd control	Crowd control
	4	Care/ consideration of special “victims”/ needs (rape, child abuse, cultural differences)	Care/ consideration of special victims/ needs (rape, child abuse, cultural differences)
Prioritization of care in an uncontrolled environment	1	Safety	Safety
	2	Triage	Triage
	3	Disaster management	Disaster management
	4	Preparation for alternative intervention in an austere environment with a lack or failure of resources	Preparation for alternative intervention in an austere environment with a lack or failure of resources
	5	Collaboration with experts	Collaboration with experts
	6	Use to forensic medicine principles	Use to forensic medicine principles
	7		Knowledge of fire-fighting equipment
Prevention, Promotion and Rehabilitation	1	Health education	Health education

4.3.4.2 The second step

The second step **of** this phase was to formulate an instrument for education, training and evaluation of the emergency nurse. The document above, together with the comparative weighting of the main and sub-items and the competency rating, were utilized during this phase. With the assistance of a statistician, the main-items and sub-items weighted during Phase One were used to employ a methodology referred to as "Modeling of Human Judgments

The weights obtained for the main-items and sub-items were analysed according to the Judgment Matrix Modeling by the statistician. The scaled weights were calculated as seen in **Table 4.13 and Table 4.14 below**. This analysis was done based on the information gathered from the VAS data in Tables 4.3, 4.4 and 4.5. These scaled weights were then used during Phase four.

Table 4.13: Scaled weights for the main-items

Main Items scaled weights			
Main Item	**Coeff**	**exp**	**Scaled Weights**
1	-0.2843	0.752540849	0.094
2	0.021	1.021222052	0.128
3	-0.0671	0.935101686	0.117
4	0.1583	1.171517597	0.147
5	0.0456	1.046655665	0.131
6	0.0037	1.003706853	0.126
7	0.0446	1.045609532	0.131
8	0	1	0.125
	Total	7.976354235	1.000

Table 4.14: Scaled weights for the sub-items

Sub-item scaled weights			
Pre-hospital Environment			
Main Item 1			
Sub-Item	**Coeff**	**exp**	**Scaled Weights**
1	0.19436	1.214533436	0.288
2	-0.01171	0.988358295	0.235
3	0.00663	1.006652027	0.239
4	0	1	0.238
	Total	4.21	1.000
Main Item 2			
Sub-Item	**Coeff**	**exp**	**Scaled Weights**
1	0.25796	1.294287046	0.564
2	0	1	0.436
	Total	2.294	1.000
Main Item 3			
Sub-Item	**Coeff**	**exp**	**Scaled Weights**
1	2.13678	8.472113455	0.707
2	0.92054	2.510645773	0.210
3	0	1	0.083
	Total	11.98275923	1.000
Main Item 4			
Sub-Item	**Coeff**	**exp**	**Scaled Weights**
1	-0.11411	0.892159813	0.167
2	-0.0053	0.99471402	0.187
3	0.39109	1.478591581	0.277
4	-0.03262	0.967906294	0.181
5	0	1	0.187

	Total	5.333371708	1.000
Main Item 5			
Sub-Item	**Coeff**	**exp**	**Scaled Weights**
1	1	2.718281828	1.000
	Total	2.718281828	1.000
Main Item 6			
Sub-Item	**Coeff**	**exp**	**Scaled Weights**
1	-0.31548	0.72943866	0.197
2	-0.10472	0.900576649	0.243
3	0.07738	1.08045257	0.291
4	0	1	0.270
	Total	3.710467879	1.000
Main Item 7			
Sub-Item	**Coeff**	**exp**	**Scaled Weights**
1	0.113406	1.120086596	0.168
2	0.287793	1.333481245	0.200
3	0.276671	1.318732437	0.198
4	0.010194	1.010246035	0.151
5	-0.1123	0.893780553	0.134
6	0	1	0.150
	Total	6.676326866	1.000
Main Item 8			
Sub-Item	**Coeff**	**exp**	**Scaled Weights**
1	1	2.718281828	1.000
	Total	2.718281828	1.000

Emergency Room			
Main Item 1			
Sub-Item	**Coeff**	**exp**	**Scaled Weights**
1	0.12016	1.127677266	0.273
2	0.00245	1.002453004	0.243
3	0.00254	1.002543229	0.243
4	0	1	0.242
	Total	4.132673498	1.000
Main Item 2			
Sub-Item	**Coeff**	**exp**	**Scaled Weights**
1	1.450313	4.264449079	0.810
2	0	1	0.190
	Total	5.264	1.000
Main Item 3			
Sub-Item	**Coeff**	**exp**	**Scaled Weights**
1	1.93398	6.916985131	0.656
2	0.96471	2.624026578	0.249
3	0	1	0.095
	Total	10.54101171	1.000
Main Item 4			
Sub-Item	**Coeff**	**exp**	**Scaled Weights**
1	0.07432	1.077151439	0.201
2	-0.00823	0.991804766	0.185
3	0.236423	1.266710015	0.237
4	0.011158	1.011220483	0.189
5	0	1	0.187
	Total	5.346886702	1.000

Main Item 5			
Sub-Item	**Coeff**	**exp**	**Scaled Weights**
1	-0.05997	0.941795612	0.241
2	-0.05616	0.945392589	0.242
3	0.023226	1.023497824	0.262
4	0	1	0.256
	Total	3.910686025	1.000
Main Item 6			
Sub-Item	**Coeff**	**exp**	**Scaled Weights**
1	-0.00825	0.991787905	0.252
2	-0.00174	0.998261513	0.254
3	-0.05611	0.945435132	0.240
4	0	1	0.254
	Total	3.93548455	1.000
Main Item 7			
Sub-Item	**Coeff**	**exp**	**Scaled Weights**
1	0.073248	1.075997351	0.139
2	0.19013	1.209406327	0.157
3	0.091349	1.095651321	0.142
4	-0.0343	0.966278678	0.125
5	0.198275	1.219297655	0.158
6	0.142336	1.152963518	0.149
7	0	1	0.130
	Total	7.719594849	1.000
Main Item 8			
Sub-Item	**Coeff**	**exp**	**Scaled Weights**
1	1	2.718281828	1.000
	Total	2.718281828	1.000

These scaled weights were then utilized to develop formulae for evaluation of competency according to the weighting of each main and sub-item. The evaluation instrument developed has a 3 point Likert Scale where not competent = 0, competent = 0.72 and highly competent = 1 as rated by the expert focus group during Phase Two. This instrument follows as **Table 4.15 and Table 4.16** below.

Table 4.15: SG Emergency Nursing Instrument (Pre-hospital)

SG Emergency Nursing Instrument			
Pre-hospital environment			
	Not competent	**Competent**	**Highly Competent**
	(0)	**(0.72)**	**(1)**
1.The Scientific Nursing Process:			
1.Primary and secondary assessment			
2.Planning (protocol based)			
3.Management (protocol based)			
4.Continuous evaluation			
2. Emergency Preparedness:			
1.Availability of equipment (knowledge of its mechanics)			
2.Individual knowledge base and skills of:			
• primary and secondary survey			
• advanced life support with/with out technical support			
• consideration for patients with special needs			
• application of communication systems			
• decontamination			
3. Prioritization:			
1.Triage according to principles			
2.Individual prioritization through use of ALS principles			
4. Resuscitation:			
1.Ethical considerations			
2.Identification of patients requiring resuscitation			
3.Knowledge, skills and techniques of BLS and ALS			

4.Pharmacological intervention			
5.Documentation			
5. Stabilization:			
1.Safety (self, scene, vehicles, patients)			
• immobilization			
• extrication			
• transportation			
• pharmacological intervention (ALS protocols and Scope of Practice)			
6. Crisis Intervention:			
1.Defusing			
2.Critical incident crisis intervention			
3.Crowd control			
4.Care/consideration of special victims/needs (rape, child abuse and cultural differences)			
7. Prioritization of care in an uncontrolled environment			
1.Safety			
2.Triage			
3.Disaster management			
4.Preparation for alternative interventions in an austere environment with lack or failure of resources			
5.Collaboration with experts			
6.Use of forensic medicine principles			
8. Prevention, Promotion and Rehabilitation:			
1.Health education			

Table 4.16: SG Emergency Nursing Instrument (Emergency Room)

SG Emergency Nursing Instrument			
Emergency Room			
	Not competent	**Competent**	**Highly Competent**
	(0)	**(0.72)**	**(1)**
1.the Scientific Nursing Process:			
1.Direct (focused) primary and secondary assessment			
2.Planning (definitive, advanced, supportive)			
3.Management (definitive, advanced, supportive)			
4.Continuous evaluation			
2. Emergency Preparedness:			
1.Availability of equipment (knowledge of its mechanics)			
2.Individual knowledge base and skills of:			
• primary and secondary survey			
• advanced life support with/with out technical support			
• consideration for patients with special needs			
• application of communication systems			
• decontamination			
3. Prioritization:			
1.Triage according to principles			
2.Individual prioritization through use of ALS principles			
4. Resuscitation:			
1.Ethical considerations			
2.Identification of patients requiring resuscitation			
3.Knowledge, skills and techniques of BLS and ALS			
4.Pharmacological intervention			
5.Documentation			

5. Stabilization:			
1.Safety (self, environment, patients)			
• immobilization			
• extrication			
• transportation			
• pharmacological intervention (ALS protocols and scope of practice)			
2.Unpackaging			
3.Assessment and management of minor and major conditions (cardiac and haemodynamic monitoring with appropriate interventions, oxygenation and ventilation)			
4.Referral for specialist care			
6. Crisis Intervention:			
1.Defusing			
2.Critical incident crisis intervention			
3.Crowd control			
4.Care/consideration of special victims/needs (rape /child abuse, cultural differences)			
7. Prioritization of care in an Uncontrolled Environment:			
1.Safety			
2.Triage			
3.Disaster management			
4.Preparation for alternative interventions in an austere environment with lack or failure of resources			
5.Collaboration with experts			
6.Use of forensic medicine principles			
7.Knowledge of fire fighting equipment			
8. Prevention, Promotion and Rehabilitation:			
1.Health education			

This tool can be used to calculate the relative importance of each main and sub-item in relation to the others according to the scaled weights **in Table 4.13 and Table 4.14**. It could serve as a guideline for educational preparation and clinical experience.

The instrument above could be used as an evaluation instrument as follows:

Pre-hospital Environment			
	not competent	**competent**	**Highly Competent**
	(0)	**(0.72)**	**(1)**
1.The Scientific Nursing Process			
1.Primary and secondary assessment	/		
2.Planning (Protocol based)		/	
3.Management (Protocol based)			/
4.Continuous evaluation		/	

An example is given above of main-item 1 with the sub-items 1 – 4 within the pre-hospital environment. Hypothetically the student was evaluated and for sub-item 1 was not competent, sub-item 2 competent, sub-item 3 highly competent and sub-item 4 competent. The ticks indicate the level of competency. The scores for the sub-items (s) taken from Table 4.14 for main-item 1 are as follows: s1 = 0.288, s2 = 0.235, s3 = 0.239, s4 = 0.238. These will be used multiplicatively with the scoring obtained by the students (the competency rating) according to the formulae below.

To calculate the total obtained for **main–item 1 =**

s1 s2 s3 s4
(0.288*0) + (0.235*0.72) + (0.239*1) + (0.238*0.72) = 0.579

Thereafter all the sub-items (s) are calculated as above, until a scoring has been done for each main-item (M) within either the pre-hospital environment and/or the emergency room.

Once all the sub-item totals have been obtained then the overall total is calculated, using the scores obtained in Table 4.13 for the main-items (M) as follows:

M1= 0.094, M2 = 0.128, M3 = 0.117, M4 = 0.147, M5 = 0.131, M6 = 0.126, M7 = 0.131 and M8 = 0.125. Therefore the overall total =

[(0.094*M1 total) + (0.128* M2 total) + (0.117*M3 total) + ……] = (total) * 100 = ? %

NB: * indicates multiply.

The tool can be used for formative evaluation (of each main-item) throughout the year to evaluate the level of competency of the emergency nurse in training, as progressive developmental preparation or evaluation before the summative evaluation (all the main-items).

4.4 Discussion of Findings

The purpose of this study was to explore and describe the role of the South African emergency nurse in the pre-hospital environment and the emergency room in order to develop guidelines for education of this nurse and to influence the development of an appropriate Scope of Practice.

The purpose of the study was achieved through the following objectives as stated in the introduction:

- to explore and describe the role of the emergency nurse in the pre-hospital environment;

- to explore and describe the role of the emergency nurse in the emergency room;
- to formulate an instrument that can be used for policy formation, education, training and evaluation.

An action research design as previously described in Chapter 3 was used in this study, employing both a qualitative and quantitative approach to investigate the role of emergency nurses in the pre-hospital environment and emergency room by means of an exploratory, descriptive, contextual four-phase study. The use of quantitative and qualitative approaches and triangulation enabled discovery and verification, so attention could be drawn to the complexities and anomalies of the situation being studied. Foss & Ellefsen (2002:245) similarly and successfully employed this methodology in their study. In this study the collaborative, participative, multifaceted nature of enquiry led to discovery of valid reliable information. This is the foundation on which a valid scope of practice can be developed for the emergency nurse, which in turn allows for self-determination and empowerment.

Williamson et al, (2004:153) used action research where successive phases were built on preceding phases for uncovering new knowledge and bringing about effective organizational change. A phased approach was valuable in this research as information was obtained in each phase that was important for the successive phases. The instrument development could not be done without the preceding phases. The inclusion of multiple sources for information gathering in different phases, added to the validity, reliability and depth that was achieved.

The contextual nature of this research means that the results cannot be generalized. Wallis & Tyson (2003:75) confirmed this in their study when they concluded that their results

should be treated with caution, as generalizations could not be made but the results could provide direction for future research. This statement is important in relation to the findings of this research, owing to its contextual nature. However, the results could provide direction for other clinical nursing specialities.

The first two objectives of the study were met during **Phase One** through role identification and clarification. The roles were validated and verified by an overwhelming majority of the study participants to the questionnaires sent out to the wider population of emergency nurses during **Phase Three**. None indicated that the emergency nurse does not have a role to play in the pre-hospital environment, despite the shortcomings identified by the expert focus group, with regard to the experiential time. This is significant when establishing the boundaries for emergency nursing practice, which is one of the problems identified as the impetus to the study. The results of the questionnaire indicated four roles (sub-items) with the highest scores for disagreement. These were: Pre-hospital crowd control = 17 (18.08%), Emergency room crowd control = 15 (15.96%), Pre-hospital defusing = 15 (15.96%) and Emergency room use of forensic medicine principles = 14 (14.89%). These aspects should be considered in future educational planning for emergency nurses.

An overview of research in this field highlighted a shortage of studies on the roles of the emergency nurse. This has not been done before in South Africa. However, much research has been done in this field in the USA and the UK. Within the South African context all registered nurses are regarded as practitioners who have an independent role but not to the extent of the ‘nurse practitioner’. This has created an opportunity for emergency nurses, especially in the rural areas, to develop their roles collaboratively with the rest of the

emergency health care team, as they are the primary emergency health caregivers. This is important in the light of the development of primary emergency health care and meeting the needs of the country, which was also established in the study done by Chang et al, (1999:268).

That the boundaries in which the emergency nurse practices, include the pre-hospital environment was confirmed by Suserad et al (2003:13), who stated that in Switzerland there should be at least "one nurse on each ambulance by 2005". The American ENA Scope of Practice (American ENA, 1999:1-9) outlines the areas of practice, which include the pre-hospital environment. Therefore, the findings of this study are in line with international practices.

The third study objective was the development of an instrument for policy formation, education, training and evaluation of the emergency nurse. The instrument for policy formation was achieved through the role identification and clarification achieved in **Phase One**, which was validated in **Phase Three**. An instrument **(Table 4.12**) was developed during **Phase Four** to indicate these roles. This, together with the weighting scales developed from the subjective pair-wise comparisons done during **Phase Two** and the competency rating, were used to develop the instrument for education, training and evaluation of the emergency nurse (Table 4.15 and Table 4.16).

The importance of role clarification for advanced nursing practice was highlighted by Marsden (2003:26,31) who demonstrated that it was important to develop a coherent educational strategy based on a coherent development of roles, to provide nurses with appropriate knowledge and skills to carry out roles at an advanced level. This included a

coherent development of **new roles with an adequate framework for practice** (Marsden, 2003:31). Although this was specifically related to nurse practitioners the results are important for this study. No research has been done on relative weighting of roles of nurses. Therefore this study brings about a new dimension regarding the planning for education, training and evaluation of emergency nurses. The level of education and training assigned to the various roles can be determined in relation to their weighting. Likewise, the level of evaluation will differ according to the weighting.

Through communication with emergency nurses, problems in practice due to a lack of clarity of professional roles were identified. This brought into focus the problems experienced by nurse educators and nurse in training when trying to complete their clinical practical objectives. It was established that this problem affecting the majority of emergency nurses was not a new one and that an attempt had been made to solve the problems relating to the level of practice and the environment in which to practice. The role of the SANC, created an awareness of the daunting nature of trying to solve the identified problem.

The literature review confirmed that this was an international problem to which some countries had found solutions. Various options were reflected upon and the realisation that emergency nurse specialists themselves had to develop an appropriate scope of practice became the focal point for the research. Although educational programmes are available and have been used since 1986 in South Africa there is no evidence to prove that what is being done is appropriate for the practice. Did it grow in this direction out of a need to support other members in the team, or out of a need for improved patient care? A literature review of research methodologies led to the selection and use of action research as it

involves a participatory process where practitioners as co-researchers seek to challenge their action theory and change practice" (Wallis & Tyson, 2003:76), and its validity lies in that it will bring about understanding of a worthwhile problem and change in practice. This process was followed and resulted in the identification of the emergency nurses roles for development of a framework for practice.

During the expert focus group interview all the processes mentioned under Table 1.1 in Chapter 1 helped with conceptual clarification and to strengthening of the resolve that emergency nurses had to **collaboratively** bring about change in practice for the future of emergency nursing. The expert focus group and researcher became true participatory co-researchers. This was carried through during Phase Three where the population was included as participants for decision-making. The collaborative relationship developed need to be continued in the future motivation for the development of an appropriate scope of practice. The discussions elicited information that needs to be kept in mind for future education and training of emergency nurses.

The statistical preparation and analysis of **Phase Two** indicated that the methods used for educational instruction and evaluation required a review and revision. The time spent on educational and skill development is based on what has been done before, really experientially based. The subjective weighting provided an alternative tool on which to base education and evaluation of emergency nurse in training. This process indicates that not all the roles are equally important, thus requiring different levels/time/depths of education, training and evaluation. The expert focus group opinions were in line with outcomes-based education, which is based on the principle that learners should be evaluated on two levels: competent or not competent. The high standard set for

competency, being 72% on the VAS, indicates how competent this emergency nurse must be for safe competent practice. This needs further testing to assess whether it is realistic and how it will affect education and practice of the emergency nurse.

Phase Three required much reflection and interpretation of other data identified by the respondents. It confirmed the realization of how an unclear scope of practice has caused a lack of conceptual clarity. The process of conceptual analysis in Phase One enabled inclusion of the other data identified in Phase Three, under sub-items that were identified during Phase One. If conceptual clarification had not been done this phase would have led to many duplicative sub-items. Planning for this phase identified the lack of emergency nurses to cope with the huge need in this country because of a lack of basic preparation in the basic nursing course, inadequate numbers being trained, inadequate emergency health care personnel in all fields, inadequate resources and the increasing need for emergency health care services. This problem is compounded by inadequate legislative support within a changing political, social and educational system. Even if education and the Scope of Practice are corrected, this will not solve the problems related to meeting the need.

Phase Four quantification of the instrument enabled educational preparation and evaluation to be tied in with the weighting scales that were developed. The roles identified could serve as a framework to facilitate the development of an appropriate scope of practice for emergency nurses. This could then be extrapolated for other clinical specialist nurses, as they have similar problems regarding legislative guidance and support in the South Africa context. The process does not end here as emergency nursing is a dynamic process and these instruments will have to be reviewed periodically.

One of the steps of action research involves reflecting upon the subjective meaning, as the study is shaped by cultural and social factors (Foss & Ellefsen, 2002:245). It also entails reflection on the consequences of applying the new knowledge and of change. Emergency nurses will have to decide whether this new knowledge makes sense within the new context. As they are open systems that continuously communicate with the environment with which they exchange energy and matter they will co-create their world (Fitzpatrick & Whall, 1983:278) and so affect their environments. The ontological perspective of action research is that the construction of reality occurs through reflective action to generate knowledge that is not only obtained from that action but to develop a science of action to bring about a change in the lived experiences of those involved (Denzin & Lincoln, 1994:333). **This is important** as emergency nursing is a discipline which has its own dynamic blend of knowledge, skills and values to meet the changing demands for health care and which continues to develop to a higher level of organization. Reflective thinking occurred throughout all the phases as an individual and as part of the emergency nurse population. The involvement of other emergency nurses, especially in clinical practice created a greater awareness of the reality versus the theory. All the participants had to do some reflection, which could be tapped into during the first two phases, but not the third. Their reflection should prepare them for change.

4.5 Summary

This chapter discussed the descriptive and inferential statistics employed to identify, analyse and synthesize the data, interpret the findings and develop an instrument for the emergency nurse.

In this study the findings of Phase Four depended on the results of the findings of the preceding phases that involved the processes of:

Phase One consensus agreed data of the roles of the emergency nurse (Main and sub-items), identified by the expert focus group were collated to produce a document for Phase Two weighting and Phase Three validation.

Phase Two subjective pair-wise weighting of the main and sub-items resulted in weighting scales being produced. A 3-point **competency rating** scale was developed for development of the quantified instrument.

Phase Three descriptive and statistical analysis of information obtained through the questionnaires **validated and verified the data** of the expert focus group as no new roles were added.

Phase Four involved the data produced during phase one and validated during phase three to formulate an **instrument for policy formation**. The weighting and competency rating done by the expert focus group during Phase Two was used in conjunction with the validated data which was quantified to produce an instrument called the **"SG Emergency Nursing Instrument**" for use as an educational and evaluation tool. This quantified instrument can be used to improve educational and evaluation practices in the speciality of emergency nursing.

The following chapter will discuss the summary of the research findings, conclusions, limitations of the study, and recommendations for policy formation, education, practice and further research.