

THE DEVELOPMENT OF NURSING CARE STANDARDS BY MEANS OF
PEERGROUP CONSENSUS FOR SELECTED CRITICAL AND HIGH CARE
SITUATIONS IN NAMIBIA AND THE IMPLEMENTATION THEREOF BY MEANS OF
SELFSTUDY LEARNING PACKAGES. AN EXPERIMENTAL STUDY.

by

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DOCTOR IN NURSING SCIENCE

at the

UNIVERSITY OF NAMIBIA

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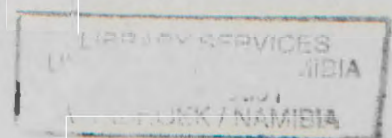
December 1995

I declare that:

"THE DEVELOPMENT OF NURSING CARE STANDARDS BY MEANS OF PEERGROUP CONSENSUS FOR SELECTED CRITICAL AND HIGH CARE SITUATIONS IN NAMIBIA AND THE IMPLEMENTATION THEREOF BY MEANS OF SELFSTUDY LEARNING PACKAGES. AN EXPERIMENTAL STUDY."

is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of references.

L.F. SMALL



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SUMMARY

This study was done to develop means to enhance the standard of nursing care delivered to patients in selected critical care (life threatening or potentially life threatening) situations.

With the contribution of the peer group ten (10) situations were identified and ten (10) learning packages were developed to address each of these situations. The researcher added an eleventh "situation" and an eleventh learning package was subsequently developed.

The peer group was involved in the development as well as in the pilot testing of these learning packages.

For the final testing of the learning packages, an experimental design was utilized. Volunteer registered nurses were asked to participate after which they were divided into any of four groups according to the Solomon Four Group Design. Two of these groups were the experimental groups and two groups the control groups. The experimental groups received the learning packages to study and after ten (10) weeks all four groups were tested and the results analysed.

The results indicated that the two groups who received the learning packages (the experimental groups) did significantly better than the two groups who did not receive the learning packages (the control groups).

The experimental groups also evaluated the learning packages. They agreed upon the content

and the importance of the learning packages. They, however, recommended some changes with regard to more support methods, more reading material and a longer time span.

A final component of the study was the evaluation of the experimental groups at their place of work by coordinators or specially appointed persons. This evaluation indicated that there is a need for such learning packages and that the content was relevant. The evaluators also felt that there was an enhancement in the participants in their knowledge level, but that their psychomotor performance could have shown improvement. Recommendations, based on the findings of the study were made. These recommendations were addressed: issues such as continuing education, accreditation, motivation for enrolment, support for students, methods to maintain skills in low-census and low-activity environments, methods to minimize professional isolation. Finally ways were discussed to help with technological support.

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CHAPTER 1

INTRODUCTION TO THE STUDY

1.1 BACKGROUND TO THE STUDY

The need for the development of improved critical nursing care is a national problem in Namibia (Small, 1988:143-165).

While the need is present in all the hospitals in the country, it is less urgent in the two regional central hospitals, Windhoek and Oshakati. Priority for improvements need to be directed to the nursing services of all the other hospitals, while the central hospitals could meet the needs of their services by means of in-service education, as specialist doctors and nurses are available at these centres.

A way has to be found to provide an improved service in all hospitals, but in particular in the rural hospitals. It is envisaged that a system of continuing education by means of distance education might be the solution to the problem. This research project is aimed at exploring the feasibility of such an approach, and of preparing learning packages to attain the desired objective.

This could be a cost effective approach, for Small (1988:175), a lecturer in the Faculty of Medical and Health Sciences, recommended that tutors of this faculty be involved in the compilation of the proposed learning packages. This would be a valuable learning

experience for the tutors for their own continuing education, as well as meeting the learning needs of the registered nurses who have to provide such care without the benefit of a post-registration nursing qualification.

This concept indicated that research has to be done to test the feasibility of such a form of continuing education to meet this specific need.

Therefore the title of the research project is:

The development of nursing care standards by means of peer group consensus for selected critical and high care situations in hospitals in Namibia and the implementation thereof by means of selfstudy learning packages. An experimental study.

1.2 THE BACKGROUND TO THE PROBLEM

Critical care nursing is currently provided by registered nurses who, in many centres in Namibia lack the necessary knowledge and skills. Furthermore, limited opportunities are available for continuing education and in-service education to rectify any deficits in knowledge and skills.

Contributing to the problem, certain factors also aggravate the situation. These factors

were also highlighted by the researcher (Small, 1988:3-16). These were, and still are:

1.2.1 Insufficient Critical Care Trained Nurses

- * There is a shortage of registered nurses with a knowledge of critical care nursing. Before 1986 there were only twenty two nurses with a post-registration qualification in intensive (critical) care nursing.

Since then the Faculty of Medical and Health Sciences has taken up the training of nurses in intensive (critical) care nursing and an additional twenty one (21) have registered in this nursing care speciality with the South African Nursing Council.

Although there is an improvement in the statistical evidence the problem still remains. The qualified intensive care nurses are all functioning in intensive care units and high care units in selected hospitals in the country. Nevertheless, all hospitals in Namibia admit patients from time to time who require specialized critical care. Every registered nurse in hospitals in Namibia will during the course of her daily work be faced with such a situation and will need the knowledge and skills to provide a life-saving service.

1.2.2 Insufficient Critical Care Beds

- * Apart from the shortage of qualified critical (intensive) care nurses, there is also

a shortage of special units for the care of critically ill patient.

- In Windhoek there are three hospitals that cater for critical care patients. Their combined critical care beds number fourteen (14).
- The intensive care unit at Oshakati caters for seven (7) patients, while the recently opened critical (intensive) care unit at Rundu has a bed capacity of five (5).

Namibia, a country with 1.5 million people, has 26 critical (intensive) care beds. It must, however, be mentioned that no norm exists on the ratio of critical (intensive) care beds to other hospital beds. Much depends on the geographic, economic and logistic problems and the health care policies in determining norms. Namibia has not decided on this issue as the tendency appears to be to develop a progressive patient care system which virtually allocates large sections of a hospital to critical and high care use. This will need a greater number of nursing personnel who have an adequate level of knowledge of critical nursing care, for this covers high care as well.

- In addition to the critical (intensive) care beds, in certain hospitals, a couple of hospitals have high care units to cater for the severely ill patients. They are:
 - * Swakopmund - a two bed unit
 - * Mariental - a one bed unit

- * Otjiwarongo - a five bed unit
- * Keetmanshoop - three high care areas in general wards
- * Onandjokwe - a five bed unit

Of all these hospitals with high care units, only Onandjokwe has a qualified critical (intensive) care nurse. The remaining hospitals have no specialist trained nurses for this purpose.

From the previous discussion it is evident that there is a shortage of critical (intensive) and high care units, and when they are available, suitably trained nurses are not available. Nevertheless, patients needing critical care will be found in nearly every hospital in Namibia (Small, 1988:144).

It is thus clear that the patient is experiencing a breach in his rights to safe care. According to Searle and Pera (1992:68) there are three basic principles with regard to the right of patients, one of which is the right to receive the quality care that he requires.

- * In addition, the safety of the patient is a major issue and he may be exposed to risky situations which again negates his rights. This has legal implications for the health care authorities as well as for the medical and nursing personnel.

1.2.3 Geographical Implications

Namibia is a vast country, and in comparison with other African and Western countries is under populated.

Namibia has a surface area of 824,295 km² and ranks as Africa's fifteenth largest country (Ministry of Health and Social Services, 1992:1).

During the population census of 1991, the population was reported as 1,401,711 with an annual growth rate of 3 percent. About one-third of the population live in urban areas (in 57 "towns") while 67 percent live in rural areas. The population density is less than two persons per square kilometre. See diagram 1.1 for an indication of the population distribution (Ministry of Health and Social Services, 1992:2 & 3).

As the majority of the population resides in rural areas(67 percent), the provision of health services is not easily achieved, and people have to travel great distances to the nearest health facility, which in 60 percent of the cases would be a clinic.

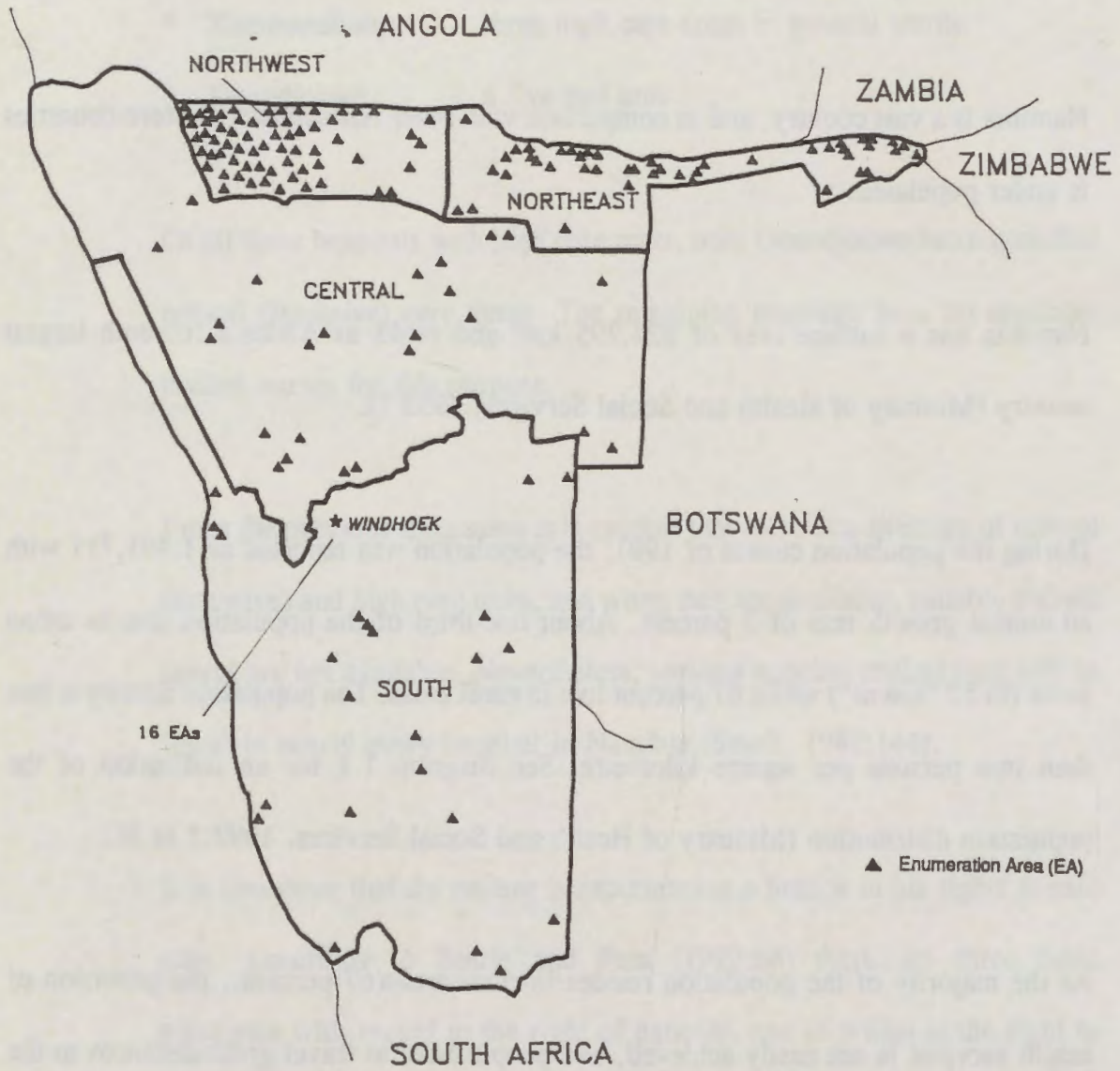


Diagram 1.1 DIAGRAM INDICATING THE POPULATION DISTRIBUTION IN NAMIBIA

See Table 1.1 for an indication of the number of health facilities and the population services.

Table 1.1 NUMBER OF HEALTH CARE FACILITIES AND POPULATION SERVED

Number of health facilities and population served by type of facility and region, Namibia 1992								
REGION	HOSPITALS	HEALTH CENTRES	CLINICS	PHC CLINICS	TOTAL POPULATION ¹	POPULATION/HOSPITAL	POPULATION/STATIC FACILITY	POPULATION/FACILITY
Northwest	9	1	66	17	642600	71400	8455	6910
Northeast	5	10	61	15	194100	38820	2554	2133
Central ²	10	2	32	11	169251	16925	3847	3077
South ³	23	6	56	17	383940	16693	4517	3764
TOTAL	47	19	215	60	1389891	29572	4946	4076

¹ Population data from 1991 census projections
² Includes 2 private hospitals
³ Includes 3 private hospitals

(SOURCE: Ministry of Health and Social Services, *Demographic and Health Survey, 1992:129*).

The vast distances become an even greater problem when it is realised that the majority of people have no transport.

See Table 1.2 for an indication of the distance to be travelled and the time it takes to reach a health facility.

Table 1.2 DISTANCE AND TIME TO NEAREST HEALTH FACILITY

Percent distribution of women by distance and time to the nearest health facility												
REGION	KILOMETRES						MINUTES					MEDIAN
	0-4	5-9	10-19	20-29	30-59	60 +	< 15	15-29	30-59	60-119	120 +	
Residence												
Urban (%)	86.6	5.5	1.9	0.6	0.5	2.2	40.9	24.8	21.6	7.6	5.0	18.1
Rural (%)	46.7	3.4	13.4	8.2	6.8	7.6	9.5	10.3	21.7	29.5	28.9	72.3
				*	*	*						**

SOURCE: Ministry of Health and Social Services, *Demographic and Health Survey, 1992:131*).

As can be seen, more than 22 percent (*) of rural patients live more than 20 kilometres away from a health facility and that the mean period to reach this facility is about 72 minutes (**). If a patient had a life threatening condition, the chances of survival would decrease significantly.

If a patient with a critical health condition does reach a health facility, the possibility

exists that only a subprofessional nurse would be available, which means he would not receive optimal treatment and have to be transferred. Even if a registered nurse is available, and the patient is treated adequately, it might also be necessary to transport the patient to another hospital for more sophisticated treatment.

Interfacility transfer in the rural regions are, however, not always available. According to Mrs Barlow (Deputy Director: Division Nursing Services) it happens from time to time that when a patient has to be transferred, the nurse and the patient wait alongside the road with the nurse holding up a "red flag" to indicate that she and the patient need transport to a hospital (Personal Report: Mrs E. Barlow, 1995).

The ideal would have been to have paramedical personnel and suitable transport available at all times. This is a costly business in a sparsely populated country.

1.2.4 Paramedical Support Services

According to Mrs Begley (Operational Manager, MRI-MEDRescue), there are only three (3) qualified paramedics in Namibia and they all are stationed in Windhoek.

There are other lower qualified ambulance personnel available who are trained in a "Basic Ambulance Course", with a course duration of only 80 hours and a group who are trained in "Intermediate Life Support" with a course duration of up to two (2) months (Begley, 1995 - Personal Conversation).

As can be seen from their length of training, it is only the paramedic who is trained in "Advanced Life Support" (4 months to 3 years) which would be able to deliver high quality emergency care in the absence of a doctor or of an intensive care nursing specialist.

Due to the shortage of suitable trained ambulance personnel, it is expected of nurses to accompany critically ill patients between hospitals.

This implies that every hospital and clinic must have a nurse trained to deal with patients with life threatening situations at the scene of emergency (in or out of a hospital) and also with transit situations where these critically ill patients have to be transported.

1.2.5 Unexpected Emergencies

Any patient may develop a life threatening condition. There are no "emergency free" situations in health care facilities.

To motivate the above statement, an example of anaphylactic shock may be used. Nearly all patients admitted to health care facilities receive some drugs. Some drugs might cause allergic reactions, and if severe, an anaphylactic reaction might occur, leading to death unless promptly treated. This implies that every registered nurse should be able to deal with an emergency situation. There is obviously a need for continuing education for nurses to meet this particular need. The question raised is whether this

could be done by means of learning packages through distance education.

1.2.6 Follow-up Advanced Critical Care Training

The field of critical care nursing is very broad and includes skills and knowledge that could be addressed by means of two stages of continuing education. The first stage would be an "introductory" learning stage. This would require packages on selected aspects of critical care nursing.

These learning packages could, however, prepare suitable candidates for a second stage of continuing education with more advanced training, also by means of learning packages and supplemented by mentor guidance, such advanced training could include:

- * Endotracheal intubation
- * Emergency cricothyrotomy
- * Needle thoracentesis

These procedures are "life saving" and may be required from registered nurses in severe emergency situations.

1.2.7 Maintenance of Critical Care Nursing Skills

Due to a low volume or low acuity environment (especially in rural areas), the maintenance of critical care skills appears to be a problem. These skills are only

acquired and retained with frequent practice and repetition.

The above-mentioned factors stress the importance of continuous updating of critical care skills. At present there is no official policy on how this could be done; though the need is admitted (Barlow, 1995 statement to Small).

This "updating" could be accomplished by means of learning packages. The importance of maintenance of critical nursing skills also becomes evident through statistics obtained from the emergency rescue organisations in Namibia. Nurses are employed in these organisations, but nurses employed at hospital level will often encounter these patients in a non-stabilized condition.

1.2.8 Accidents and Emergencies Cared for by Emergency Rescue Organisations

Windhoek has two emergency rescue organisations operating from its boundaries.

Statistics obtained from Mr Bodmann (1995), Senior Paramedic, MRI-MEDRescue, indicated a variety of accidents and emergency situations being catered for. In Table 1.3 a breakdown of cases is presented.

**Table 1.3 NUMBER AND TYPE OF ACCIDENTS AND EMERGENCIES
MANAGED BY MRI-MEDRESCUE, NAMIBIA
PERIOD: NOVEMBER 1994 - MAY 1995
(N=257)**

	NUMBER	PERCENTAGE
Motorvehicle accidents	79	30.73
Maternal emergencies	6	2.33
Burns	2	0.77
Accidents (not specified)	30	11.67
Medical emergencies (not specified)	107	41.63
Assault	17	6.61
Malaria	3	1.16
Myocardial infarction	13	5.05
TOTAL	257	100.00

All these patients were admitted through the emergency departments of the respective hospital where the registered nurse, especially in the private hospitals, had to function initially without the assistance of a medical practitioner.

This means that for such independent action the registered nurse needs knowledge and skills on the treatment of the critically ill patient. She must cope with life-threatening situations irrespective of the cause thereof. This means that with the current health policy of Namibia minor health care will be done at primary health care level and hospitals will become centres where specialised critical health care conditions are handled. Every nurse in a hospital situation has to equip herself/himself and employers should require this, to function at a much higher level of patient care than he/she was taught in their basic training.

1.3 STATEMENT OF THE PROBLEM

There is an identified need for enhancement and updating of critical care knowledge, so as to update the overall standard of critical care nursing in the country as a whole.

No specific continuing education programme other than the university diploma programme exists for registered nurses on critical care nursing. Continuing education in critical care needs to be provided to all registered nurses in hospitals. This may need a departure from the traditional attendance at a formal course of study.

The great distances between hospitals make this a priority to ensure safe patient care. These facts serve as the motivation for this research to compile self-study learning packages and to test these.

1.4 OBJECTIVES OF THE STUDY

The objectives are:

- 1.4.1 To identify, by means of peergroup assessment, the critical and life threatening situations for which standards have to be designed.
- 1.4.2 To identify the learning needs in this respect of registered nurses providing nursing care in such situations.
- 1.4.3 To develop learning packages for nurses to develop the necessary skills and knowledge to meet these standards.
- 1.4.4 To test the effectiveness of such learning packages for utilization in distance teaching.

1.4.5 To identify learning opportunities and resource needs for such situations.

1.4.6 To issue a certificate of successful completion to participants in the project should they pass the post-test.

1.5 IMPORTANCE OF THE PROBLEM

This research project is based on previous research done by the researcher. The lack of critical care knowledge and skills by registered nurses were identified (Small, 1988:165).

It implies that a patient is exposed to possible harm and/or neglect and this leads to a drop in the standard of critical and general nursing care delivery. Critically ill patients are especially vulnerable.

The problem is magnified due to a shortage of doctors in rural areas in Namibia. In emergency situations it is the nurse who is called upon to assist and treat when no medical help is available, or when available, only after the lapse of considerable time.

This means that a knowledgeable, skilful nurse is required to help prevent loss of life.

1.6 RESEARCH HYPOTHESES

Based on the review of the literature and the purpose of the study the following

hypotheses were formulated:

- * Registered nurses who have studied the learning packages will have a significant higher score in their post-test than in their pre-test (H_{i1}).
- * Registered nurses who have studied the learning packages will have significantly higher post-test scores than registered nurses who have not proceeded through the learning packages (H_{i2}).

Null (Statistical) hypotheses:

- * There will be no difference in the scores obtained between the pre-tests and the post-tests of the registered nurses who have studied the learning packages (H_{o1}).
- * There will be no difference in the final post-test scores between the registered nurses who have studied the learning packages and registered nurses who have not studied the learning packages (H_{o2}).

1.7 EXPLANATION OF KEY CONCEPTS

1.7.1 Experimental Research

This is a scientifically controlled investigation. This approach tests alternatives and identifies relationships between phenomena (Uys and Basson, 1991:38).

Experimental research is used to determine whether one variable (independent variable) has an effect on another variable (dependent variable) (Huysamen, 1984:1).

In this research project the independent variable is the learning packages and the dependent variable is the test scores obtained after completion of the learning packages.

1.7.2 Nursing care standards

According to Alspach (1991:906) standards are established measures of extent, quality, quantity, or values; an agreed-upon level of performance or a degree of excellence of care that is established.

1.7.3 Peergroup

A peergroup consists of members of a person's own profession, where there is relative equity (Mellish, 1982:187).

1.7.4 Critical care situations

Kinney, Packa and Dunbar (1988:999) define critical care situations as those where patients with life threatening physiological disturbances are cared for. Mellish (1989:174) describes critical care areas as follows:

"The care provided in these units is for critically or seriously ill patients who, because

of the health problem from which they are suffering, are unable to maintain bodily functions without extensive medical and nursing treatment and observation.

Technology is often of vital importance in this field as they may have to be linked to life support systems or electronic monitoring apparatus. The nursing care given in these units is very specialised and a very high ratio of nurses to patients is necessary."

1.7.5 Self-study learning packages

With self-study, learning package study units are supplied to students. Irrespective of the stage of the study, each package consists of the following:

- * Objectives
- * Package description
- * Content
- * Learning activities
- * Self evaluation
- * Post-test

1.7.6 Selected hospitals

The ten (10) hospitals that were approached for inclusion in the study (see Section 3.3.1).

1.7.7 Critical and life-threatening situations

Situations where patients are at high risk, and unstable, and where their conditions change not day by day, but minute by minute (Thelan, Davie, Urden and Lough, 1994:3).

1.8 SCOPE AND LIMITATIONS OF THIS STUDY

This study is concerned with the professional knowledge and skills of nurses and their contact with the critically ill as well as the not so critically ill (high care) patient in hospitals in Namibia. The purpose is to set and enhance standards by means of learning packages and by increasing the competence of the nurse.

1.9 ORGANISATION OF THE REPORT

Chapter 1

This covers the introduction, background to the problem, statement of the problem together with the hypotheses, objectives and importance of the problem. Explanations of key concepts as well as the scope and limitations are mentioned.

Chapter 2

An overview of relevant articles, textbooks and other sources that have information on

critical care nursing, standards, and distance education, is discussed.

Chapter 3

The methodology is discussed.

Chapter 4

The data processing is discussed.

Chapter 5

In this chapter the discussion of the findings with the recommendations are presented.

Annexures

Bibliography

1.10 SUMMARY

Based on previous research findings and existing problems the need does exist to upgrade the knowledge and skills of registered nurses with regard to selected aspects of critical care nursing.

This is motivated by:

- * A shortage of critical trained registered nurses
- * A shortage of critical (intensive) care units where critically ill patients can be treated with the effect that the responsibility falls on the shoulders of registered nurses without critical care training in general wards in hospitals.
- * Geographical limitations where long distances and a lack of inter-hospital transfer facilities forces the registered nurse in clinics to stabilize and manage critically ill patients until suitable arrangements can be made.
- * The regular admittance of critically ill patients either in the emergency department or directly to the ward (clinic) or the unexpected occurring emergency situation in the clinic.
- * A lack of paramedical personnel that requires the registered nurse to accompany critically ill patients and also at times to implement pre-hospital emergency care.
- * The need for advanced critical care training beyond the "selected aspects of critical care" addressed in this research.

As a result of the above-mentioned, learning packages are to be developed to rectify the identified problems. The effectiveness of these packages is then to be tested according to the stated hypotheses.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

The literature review was conducted to gain understanding of the different aspects and concepts in the setting of standards in selected aspects of critical care nursing and how these standards can be achieved. In addition a literature review on distance education and its use as a medium of instruction in this type of clinical nursing education was explored.

For this, national and international research and viewpoints were studied on these or related topics.

Research information and viewpoints were obtained with the assistance of:

- * The Academic Information Service of the University of Pretoria's Medical Library where Medline retrieval was utilized.
- * The Library of the University of the Orange Free State where Medline retrieval was utilized.

From the scrutinizing of research and published viewpoints, concepts and topics were identified as essential to clarify or to implement in order to ensure enhanced standards

in the practice field through this research.

The concepts that served as terms of reference are:

* **The setting of standards**

The research project focused on attainment of agreed upon standards. This concept will be clarified in this chapter.

The realization of these set standards requires a planned activity. The most suitable activity identified in the literature and to be described in detail is:

* **The quality improvement**

The approach to apply during this endeavour in quality improvement, is through continuing education and self-evaluation.

* **Continuing education**

There are numerous ways to offer a continuing education programme, but as was decided upon by the researcher in this specific research project and also confirmed in the literature, the most suitable is:

* **Distance education**

Distance education is a well published topic in the literature and as will become evident in the literature discussion, is a suitable and economical approach. This approach is based on the principle of adult education, which is also put into perspective in this study.

There are different methods to present distance education, and institutions in the United States of America are already mentioning "Fourth generation media". The choice in this project, is:

* **Learning packages**

As the best viable media, due to logistic and economical restraints. This aspect is also highlighted in the literature review.

2.2 RESEARCH IN THE CRITICAL CARE FIELD AND IN THE DISTANCE EDUCATION FIELD

Good quality research in these fields have been done abroad, as well as in the Southern Africa region. The leading authorities in the various fields related to the research project have published most helpful articles.

Relevant viewpoints and findings will be discussed under a series of subheadings. This is done to facilitate the utilization of the information.

2.2.1 The setting of standards

In the introduction it is stated that the research project is focused on the attainment of agreed upon standards.

In this study the following definition by Alspach (1991:906) of standards is accepted: "..... any established measure of extent, quality, quantity or value; an agreed-upon level performance or a degree of excellence of care that is establish. Standards of care, standards of practice, policies, procedures and performance criteria all establish standards."

Muller (1993:600) added to the above by stating that it is also a valid description of the desired quality of job performance.

An important component of standards is that they are predetermined by experts or authorities (Kitt and Kaiser, 1990:879).

This component was also incorporated in this research project where the peer groups were consulted as experts or authorities. This aspect is discussed in more detail in Chapter 3.

There are three types of standards, namely:

* Structural standards

- * Process standards
- * Product standards

A structural standard concerns the support structure, like the resources necessary for the provision of a health service.

A process standard is the manner in which a task should be executed. In clinical nursing a process standard is accomplished by means of the nursing process.

A product standard indicates the level of performance. In student training, it describes the performance expected of the student (Muller, 1993:600-601).

This study (research project) concentrated on enhancing "product" standards on selected aspects of critical care nursing. The standard emphasized the knowledge component (Annexure C).

It is assumed that an increased knowledge level would increase the ability of the registered nurse.

An example of the implementation of these three types of standards is summarized in **Table 2.1**. This table summarizes the standards for nursing care of the critically ill patients as compiled by the American Association of Critical Care Nurses.

Table 2.1 STANDARDS FOR NURSING CARE OF THE CRITICALLY ILL
(A summary)

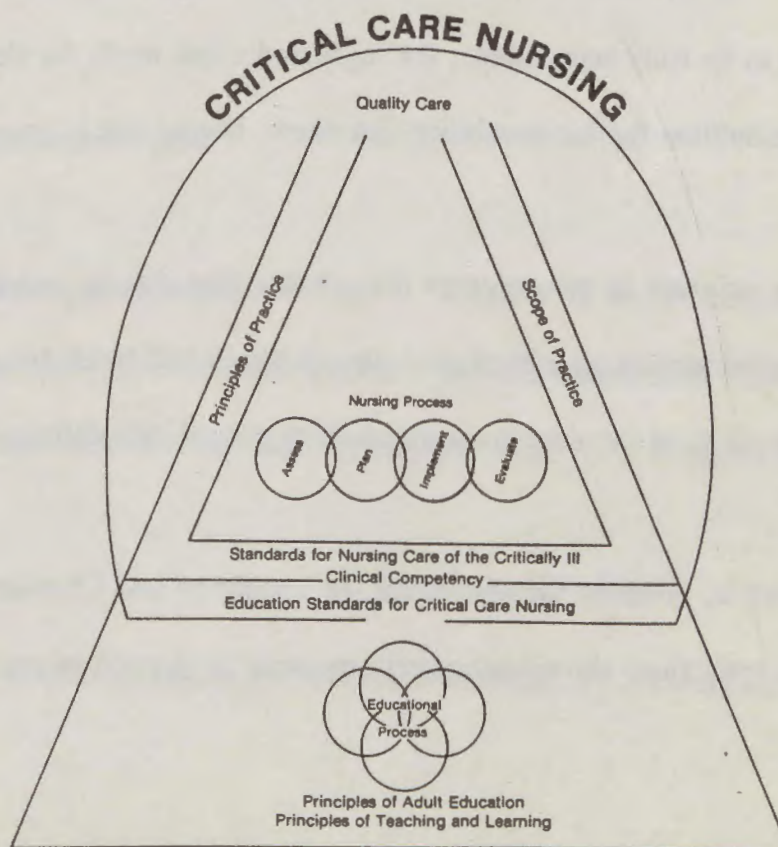
STRUCTURE	PROCESS
<ul style="list-style-type: none"> - A well designed unit to ensure safe care and treatment. - The unit must be constructed to prevent danger to personnel and visitors. - The unit must have suitable trained nurses. - The critical care nurse must engage in research. 	<ul style="list-style-type: none"> - Regular assessment and identification of problems. - Appropriate planning of care and intervention. - Evaluation of care. <p>OUTCOME (Product)</p> <p>Delivery of care is based on policies specific to the patient population.</p>

(Thelan, Davie, Urden and Lough, 1994:42).

The American Association of Critical Care Nurses has also compiled a framework for the development of the education process for critical care nursing (Fig. 2.1). This has formed a conceptual framework for the educational standards for critical care nursing.

These standards can be summarized as follows:

Figure 2.1 CONCEPTUAL MODEL FOR THE EDUCATION STANDARDS FOR CRITICAL CARE AMERICAN ASSOCIATION OF CRITICAL-CARE NURSES



(A.A.C.N., 1986:2).

**Table 2.2 EDUCATION STANDARDS FOR CRITICAL CARE NURSING
AMERICAN ASSOCIATION FOR CRITICAL-CARE NURSES
(A summation)**

STRUCTURE	PROCESS
<ul style="list-style-type: none"> - A managerial support system is in place. - Human resources are available. - Financial assistance is available. - Material resources are available. - Environmental resources are available. 	<ul style="list-style-type: none"> - All critical care educators included in the learning needs assessment. - Assessment data used to plan programmes. - The suitability of resources are evaluated.

(A.A.C.N., 1986:4-10)

In Namibia the registered nurse is accountable for his/her own actions, and he/she is accountable to his/her patients. This includes the critically ill patient. He/she already has the authority in terms of the Nursing Act (Act no. 50 of 1978), the Scope of Practice (R2598) as amended and Acts and Omissions (R387) as amended. The responsibility for caring of the critically ill patient is automatically covered in all the above (South African Nursing Council, 1978, 1987 & 1991).

But to be truly accountable, the registered nurse needs the ability base, as ability is a precondition for accountability (Scribante, Muller and Lipman, 1995:420).

The rationale in this research project was then that an increased knowledge in these selected aspects on critical care nursing would lead to enhanced skills and ability, and, as such to an increase in the standard of critical care delivery.

There is, however the realization, as Thompson and Chambers (1993:182) has stated that tests alone do not adequately measure integration of critical care knowledge and

nursing skills.

Although this limitation is accepted, there is also the reverse side of this argument. Toth (1986:182) puts it clearly by adding that safe practice cannot occur without basic knowledge. Still, the measuring of only the knowledge aspect would be insufficient as high quality care also depends on some observable elements of competence.

Alsopach (no date:10) is more direct by stating that competency can only be measured by observing how one actually performs on the job.

The above-mentioned arguments prompted the researcher to implement instruments to take these arguments into consideration. This aspect is clarified in Chapter 3.

The realisation of these standards is to be achieved through the quality improvement plan.

2.2.2 The quality improvement plan

Muller (1993:582) explains quality improvement as "... a system in which the quality of the health service is formally monitored and assessed, and where *deliberate* steps are taken, or programmes instituted to cope with *existing* problems" (emphasis by researcher).

The "*existing*" problems in this research study have been identified in a previous survey

by the researcher (Small, 1988:156), namely a lack in critical care nursing knowledge to deal adequately with critically ill patients, as well as deficiencies in the care rendered to these patients when they were nursed in general wards.

The results of that study showed evidence of a lack of knowledge and skills with regard to the nursing care of patients with life threatening or potentially life threatening conditions.

These findings prompted this "*deliberate*" step which entails the incorporation of learning packages of selected aspects of critical care nursing (life threatening or potentially life threatening aspects) to alleviate the "*existing*" conditions found in the previous study.

The quality improvement process was thus based on Kitt and Kaiser's (1990:882) view, namely:

- * Who or what needs to change
- * What actions are appropriate for the cause, scope and severity of the problem
- * Who is responsible for implementing action
- * When change is expected to occur

They (Kitt and Kaiser, 1990:882) identified three common causes of problems with regard to quality care:

- * Lack of knowledge
- * Defects in departments or hospital systems
- * Faulty behaviour or performance of staff members

The lack of knowledge (and skills) was the basis on which this research project was based and this is the aspect that needed changing first.

To address this lack of knowledge and skills, an educational programme has to be devised.

This educational programme would have to be implemented in either the formal, non-formal or informal educational system.

Tight (1983:6) has provided the following distinction between these different categories:

- * Formal education is provided by the education and training system set up or sponsored by the state for those express purposes.
- * Non-formal education consists of those educational enterprises set up outside the education system, for example ministries or departments. It could also be agencies with primary objectives to which education is subordinate, like churches or trade unions.
- * Informal education, which could be categorised as unplanned, incidental learning.

This is a vast area of social transactions in "... which people are deliberately

informing, persuading, telling, influencing, advising and instructing each other; and deliberately seeking out information, advice, instruction, wisdom and enlightenment." (Tight, 1983:6).

Informal education is still a widely used approach in nursing today. Daily "on the spot" teachings take place where one nurse has to guide or demonstrate certain procedures to another nurse. It is a valuable method, but specialised knowledge (like critical care medicine) can not be acquired totally in this manner. A more structured design is needed. Moreover, in most situations in the rural areas, a nurse who has the preparation to act as mentor or preceptor, is not available (Small, 1995 - Personal observations)

The formal and non-formal designs (categories) are deemed more appropriate. In a Southern African context Smith (1992:107) has put these designs in another perspective. According to her there are three broad groups:

*** Compensatory education**

This includes adult basic education, various forms of alternative schooling, adult night schools run by the state and academic support programmes offered at tertiary level.

This description could also be viewed as formal and non-formal if compared with Tight's (1983:6) explanation previously mentioned.

*** Education for upgrading**

This includes skills training, management training, continuing professional education and teacher upgrading.

Again, this description fits either the formal or non-formal category.

*** Cultural/political non-formal education**

Covered under this group are community development, religious education, worker education and public cultural and civic education as well as compulsory military education.

*** Continuing education as the framework**

From the discussion it becomes evident that a "framework" is needed to plan this educational programme, which is not informal, but could be formal or non-formal.

The "frame work" decided upon was continuing education, as both formal and non-formal programmes could be managed within this "framework".

2.2.3 Continuing education as a means for quality improvement

Continuing education is seen as the most suitable "framework" by means of which the necessary actions can be taken to rectify shortcomings in critical care nursing standards.

This is supported by the description of continuing education by Dolphin and Holtzclaw (1983:17). According to them continuing education is:

"..... planned, organized learning experiences designed to augment the knowledge, skills, and attitudes of registered nurses for the enhancement of nursing practice, education, administration, and research, to the end of improving health care to the public".

Adding to this is the realization that previous education is limited in its scope because it cannot be depended upon to provide all the knowledge and skills a person [nurse] will need during his or her active years (Ansere, 1994:6).

This implies an "education throughout life". Continuing education stresses the unity of the concepts of education, and indicates that it "continues" throughout life. This phrase has also become known by at least two other narrower meanings:

- * All education for adults returning to the educational system, and
- * Professional, vocationally oriented training programmes at an advanced level. The target group is adults who have already had a significant level of education (Rogers, 1992:1).

The need for continuing education is a world wide phenomena. Many countries have taken this issue to their nursing and midwifery registration bodies to make it mandatory. Many still favour a voluntary approach.

In Table 2.3 a summary of viewpoints of different countries with regard to continuing education is presented.

TABLE 2.3 VIEWPOINTS OF DIFFERENT COUNTRIES
RE CONTINUING EDUCATION

COUNTRY	VIEWPOINT	REFERENCE
South Africa	The nurse has a right and the duty to negotiate with the employer for relevant continuing education that she might need to perform her professional duties	Searle, 1995. Personal conversation
Australia	<ul style="list-style-type: none"> - The nurse needs constant access to appropriate forms of further education - Opportunities should be provided by the employers and other institutions for nurses to attend continuing education programmes 	Yuen (1991:1233 & 1234)
United Kingdom	<ul style="list-style-type: none"> - A compulsory approach has been approved - Nurses must complete a minimum of five study days every three years 	<ul style="list-style-type: none"> - Hekelman (1993:167) - Royal College of Nursing Fact Sheet (1993) - UKCC Document (April 1993)
United States of America	Continuing education is mandatory	Yuen (1991:1235)

The value of continuing education for nurses is recognised by nurse leaders and educators and in South Africa various institutions have initiated continuous education programmes (see Table 2.4 for examples of some institutions).

Muller (1992:18) in a publication based on her doctoral research in South Africa has stated that continuing education should be promoted and facilitated by the nurse administrator. Some of the requirements that she advocated are:

- * There must be evidence of nursing personnel attending appropriate professional seminars, workshops and courses to update knowledge and skills that are relevant

to their patient care.

- * Study leave should be available to make it possible to attend these workshops and courses.

TABLE 2.4 INSTITUTIONS IN SOUTH AFRICA THAT PRESENT CONTINUING NURSING EDUCATION PROGRAMMES *

INSTITUTION	COURSE OFFERED	ACCREDITATION POSSIBILITIES	COMMENTS
South African Nursing Association (S.A.N.A.)	a) Update modules on: <ul style="list-style-type: none"> - Cardiopulmonary resuscitation - Oxygen therapy - Hygiene - Pre-operative care - Vital signs b) Refresher courses, workshops & seminars: <ul style="list-style-type: none"> - for nursing auxiliaries - private hospital matrons c) Short courses in <ul style="list-style-type: none"> - pharmacology 	<ul style="list-style-type: none"> - Accumulation of credits - No possibility of inter-institutional recognition of credits as yet 	<ul style="list-style-type: none"> - Modules are based on self activities - Distance teaching model
Rand Afrikaans University (Centre for Nurse leaders)	<ul style="list-style-type: none"> - Advanced Midwifery - Health care dynamics - Community Nursing Science: Primary Health Care - Interpersonal and critical thinking skills development in nursing - Research Methodology in Nursing 	Completion of course in research methodology offers entrance to Masters degree if in possession of Baccalaureus degree in Nursing	Dual mode is followed: <ul style="list-style-type: none"> - some courses need lecturer contact - Some courses based on distance education
University of Natal	<ul style="list-style-type: none"> - Effective health education - Rural rehabilitation - Peri-natal programmes - Care & counselling of HIV positive patients - Planning and providing community literacy programmes - Committee procedure 	Not specified	Distance education format
Critical Care Nursing Forum	<ul style="list-style-type: none"> - Organizing symposia, workshops and discussion groups 	None	An interest group

(Curationis, 1994: Insert page; Nursing News, 1994:3; Nursing News, 1995: 4)

* LEGEND
All programmes are for listing and not for registration

From **Table 2.4** it is noticeable that universities have also taken up the responsibility for continuing education in nursing education.

Traditionally the university administrators and the academic community on the whole have accepted the three responsibilities of a university, namely:

- * Teaching;
- * Research; and
- * Community service.

Of these, the extension of teaching to other than the traditional full-time students and community service, are the most recent and least developed. A more recent role of the university is the provision of continuing education programmes.

As the university has two major roles, namely the generation and dissemination of knowledge, there is no reason why the dissemination should be restricted to full-time undergraduate and graduate students. It should be extended to university alumni as well as to those adults in society, although not in possession of a university degree, who can benefit from the personal enrichment and also the intellectual stimulation that a university can provide (Leirhman and Kulich, 1987:174 & 175).

Added to this is the demographic and social changes that are continuously taking place. The university has to adjust to new constituencies and their needs. These new constituencies are the mature non-employed adults who seek personal enrichment

through study. There are also people who need to enhance their knowledge and skills, like for instance professionals. Nursing, as a dynamic profession, constantly needs to enhance and upgrade their skills and knowledge (Leirhman and Kulich, 1987:176).

Continuing education, however, has to provide some incentives for the participant. In the United States of America a person is not only encouraged to further his or her education via university, but there is also a system which allows him or her to gain credits from the university for non-university education or for experiential learning.

With a modular system of adult learning, students are enabled to build up credits for recognition in their chosen tertiary studies continuing education programmes (Andrew, 1988:44).

This concept is also advocated by White and Burford (1989:25-30). They believed that shorter skills based modular programmes are the key to the future provision of adequate numbers of appropriately skilled registered nurses. Their motivation for this approach stemmed from problems encountered in South Australia. There had existed for some years the situation where the number of places available in post-registration nursing courses had been insufficient to cope with the demand. The graduation and retention numbers were also insufficient.

To solve the above-mentioned problem, it was decided to move away from the traditional 6 or 12 month course and develop a more flexible structure. The comprehensive Critical Care Nursing course which was originally 12 months, was

divided in 6 individual modules of 3 months each, plus a basic module of 6 months. Students could take any one or more modules and gradually add them up if so preferred to eventually receive a qualification in the comprehensive critical care course.

As yet there is no mechanism available in Namibia for accreditation of continuing education programmes, this matter will have to be submitted to the Nursing Board of Namibia by the providers of such programmes, eg the university and the health care authority.

What are proposed and seem feasible are:

- * If the Faculty of Medical and Health Sciences conducts the programme, it could be possible that the completion of the programme under its auspices could lead to the issuing of a certified statement.
- * Accreditation by the Faculty of Medical and Health Sciences for a paper in the subject "Scientific Foundations of Nursing: Special". This is a subject taken by post-basic registered nurses and entails the application of natural sciences to nursing as well as pathophysiology. A paper can be allocated to these packages.
- * That the Nursing Board of Namibia be requested to provide for "listing" of short courses in term of Section 25(1) of the Nursing Act 30 of 1993. This will need an amendment of the Act and appropriate regulations. In the meantime the nurse builds up credits for modules completed satisfactorily towards a qualification in critical nursing care or in advanced clinical nursing. Such a course could be approved for registration of the qualification under the provision of Section 25(1) of the Nursing

Act (The Nursing Board of Namibia, 1993).

This would act as a motivating factor to enrol for the course in selected aspects of critical care nursing.

2.2.3.1 The need for continuing education in selected aspects of critical care nursing

The concept of need in continuing education is recommended as the first stage in planning continuing education programmes. Chalmers and Kristjanson (1987:130) classified the term "need" into four categories:

- * Basic human needs
- * Felt and expressed needs
- * Normative needs
- * Comparative needs

According to them, "basic human needs" indicate a deficient state that initiates a motive on the part of the individual. This category has, however, been criticized as having little utility in the planning of programmes.

The "felt need" category implies an ultimate goal and also suggests a means of gratification. This need is limited in that it is a perceived need and may not be an actual need.

The "normative need" constitutes a gap between the "desirable" standard and the standard that actually exists. This conceptualization is a value judgement based on the level of performance by nurses and beliefs about how these nurses should change.

"Comparative needs" are determined by comparing the characteristics of those in receipt of service with others who are not.

In this research project, the normative needs prompted the initiation of the project.

Continuing education is therefore a prerequisite for safe practice of every registered (professional) nurse, and even more so in specialized fields like critical care nursing.

Without continuing education loss of knowledge and skills may occur in situations where such knowledge is not used every day.

In addition health care is a dynamic process. Advances in the biomedical sciences and medical technology require adaptation and management to new approaches in technology. As the health sciences and technology are evolving so rapidly, this requires ongoing education of all health professionals.

A special consideration for continuing education is the rural areas. As has been stated in Chapter 1 (Point 1.2.3), sixty seven (67) percent of the population live in rural areas.

The registered nurses who practice in these settings will deal with acutely ill patients

less frequently than nurses practising in large tertiary facilities.

Thompson and Chambers (1993:172) state that the effectiveness and quality of critical care practice in rural areas is based on three interlocking principles:

1. Nursing competence
2. Medical expertise
3. Technological resources

The situation in Namibia is that quite often in rural areas, the medical expertise and technological resources are not available. Nursing competence especially needs to be enhanced.

Interesting information that was presented by the above authors was the "rural critical care needs". Three needs and concerns were identified by nursing managers. In order of priority they are:

1. Maintenance of critical care nursing skills in a low volume/low acuity environment.
2. Nursing education with content appropriate to rural needs.
3. Motivation of critical care nurses in rural and small hospitals (Ibid, 1993:173).

The maintenance of critical care nursing skills in a low volume or low acuity environment appears to be a special problem. This is also the case in Namibia. Every time the nurse in a rural area is confronted with a high risk procedure of low volume

less frequently than nurses practising in large tertiary facilities.

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The maintenance of critical care nursing skills in a low volume or low acuity environment appears to be a special problem. This is also the case in Namibia. Every time the nurse in a rural area is confronted with a high risk procedure of low volume

procedure, such as an ECG interpretation, it has the potential of being a time consuming and difficult procedure for the nurse. These skills are acquired with frequent practice and repetition. Unfortunately rural nurses do not get the opportunity to learn in this way.

Among the innovations to maintain critical care nursing, Thompson and Chambers mention competency examinations as one method but they do caution that tests alone do not adequately measure integration of critical care knowledge and nursing skills (Thompson and Chambers, 1993:182).

Due to the above factors, certain very important skills like resuscitation can quickly deteriorate. Due to this the Emergency Cardiac Care Committee of the American Heart Association writes that retraining is an important issue (Emergency Cardiac Care Committee, 1992:2178).

They recommend that managers of factories, schools, office buildings, apartment buildings, stadiums, large fairs and the like, should be encouraged to train their personnel in the techniques of cardiopulmonary resuscitation (Emergency Cardiac Care Committee, 1992:2180).

The need for continuing education is thus self-evident.

Continuing education can, however, be offered by a variety of approaches. The approach that is implemented in this study project, is the "Distance education

approach".

Distance education is also used as a model to provide continuing education in Russia. At least 61 universities in Russia are utilizing this model (Le Roux, 1992:113).

In this study, the choice of the distance education model is based on the nature of the students, namely adult registered nurses and the distances from a central hospital.

2.2.4 Registered nurses as adult learners

Adult teaching is encompassed in "andragogics". This term is derived from the Greek word "aner", which means man, and "ago", which means leading.

This implies that the learner is led by a "facilitator" rather than by a teacher.

There are certain assumptions about adult teaching. Paton, Botha, Dürnheim, Wilson, Tjallinks and Van der Wal (1989:310) states: "the self-concept of an adult changes from being a dependent person to that of a self directed person".

Self-direction in learning is a way of life. This is not exclusively by the domain of adult educators, as learning takes place across the entire lifespan, but it is often said that the purpose of adult education is to enhance an "inner-directed" motivation in an adult (Brockett and Hiemstra, 1991:19).

To understand the exact meaning of self-directed learning, it must be described within the four categories which comprise lifelong learning, namely:

- * Formal, where "learners have no control over the objectives or means of their learning";
- * Non-formal, where "learners control the objectives but not the means";
- * Informal, where "learners control the means but not the objectives"; and
- * Self-directed, where "learners control both the objectives and the means" (Brockett and Hiemstra, 1991:19).

There is, however, also the viewpoint that not all adults are self-directed learners. According to Gravett (1993:74), not everyone has the necessary self knowledge, subject knowledge and critical abilities to determine their own learning needs. But they do have a deep psychological need to be viewed as self-directed by others.

This view is shared by Merriam and Cunningham (1989:228) who stated that it would be naïve or even irresponsible to grant too much freedom on the part of the students to choose their own objectives and methods of learning. Their abilities and skills as well as the resources should first be considered. They are of the opinion that students can gain more control (be self-directed) by accepting guidance and support.

In this research project the definition of "self-directed" as stated by Brockett and Hiemstra (1991:19) is not utilized. The definition of "informal" is more applicable in this study.

The researcher, however, supports the notion that self-directed learning should be enhanced in order for students to take the initiative, with or without the help of others in diagnosing/identifying their learning needs, formulating learning goals, identifying resources, implement strategies and evaluate the learning outcomes.

The students (participants in the research project) have, however, the opportunity to evaluate the learning packages (explained in Section 2.2.5.4 and Chapter 3) and propose changes with regard to the objectives, content, learning activities and evaluation format contained in these packages.

Paton et al (1989:310) and Cranton (1989:17-19) stated the following assumptions about adult teaching:

- * The adult learner collects an ever-increasing reservoir of knowledge and experiences which, in themselves become a source of knowledge and learning.
- * The focus of the adult learner becomes more oriented to the development task of his social roles.
- * The time perspective of an adult learner regarding the application of knowledge changes from a prolonged perspective to a more urgent and immediately applied perspective.

All these assumptions support the selected approach in continuing education, namely distance teaching.

In Namibia, the majority of nurses are women. Lemmer (1992:111) states that adult women learners are 25 years of age and older, enrolls in any form of training, formal or non-formal. This is usually after a break of at least two years, most often due to domestic demands.

What is also important to keep in mind is that although certain features of adult learners are generic, women reveal gender-related characteristics and attendant needs. They also face concomitant barriers to entering educational programmes.

An important matter raised by Lemmer (1992:111) is that women regard knowledge in terms of the context of their own lives, stressing the personal aspects.

The content (topics) for this continuing education programme was selected by nurses themselves and focus on emergency situations that they may encounter in the execution of their professional activities.

Lemmer (1992:112) also states the barriers that adult women experienced when enrolling in educational programmes like:

*** Personal barriers**

Women might have a lack of confidence which results in a fear of risk-taking, dependency and poor self-imaging.

* Situational barriers

Family responsibilities with time management problems impeding on her academic activities.

From these barriers, it is clear that academic programmes have to be constructed in a way to accommodate as many students as possible.

Lemmer (1992:113) provides a possible solution to the above-mentioned by stating that the learning environments for adult women learners must not be strictly classroom-oriented.

One approach is distance education.

2.2.5 Distance education

"Distance education is the most practical and cost effective strategy for addressing this demand ... (for expanded access to education at all levels) ... and providing quality education."

This quotation is from the Ministry of Education and Culture in Namibia in their draft document "Toward Education for all" (Ministry of Education and Culture, 1992:59).

Distance education is not a separate entity. It should be seen as an essential

complimentary element to conventional education (Saunderson and Roman, 1993:2). It is also an increasingly popular means of providing post-registered nurses baccalaureate education (Cragg, 1991:256). There are thousands of nurses in the Southern African region who are undertaking baccalaureate study through the distant teaching medium. The concept of distance education for further education for nurses is thus well established and respected.

Distance teaching has different meanings for different people. It can be viewed as the arrangement of teaching and learning strategies to reach people who have learning needs (Pym, 1992:384).

The structure of distance education has been outlined by Merriam and Cunningham (1989:226) and may help to put the course followed by the research participants in the correct category. They stated the following classification for distance education institutions:

- (I) public and private correspondence schools
- (II) distance teaching universities
- (III) independent study divisions of conventional schools
- (IV) the consultation model
- (V) the integrated mode

The first two types are autonomous, while the other three types are found within the structure of a conventional institution. The distinguishing feature between the two

autonomous institutions is their use of media and support for learning.

The type I institutions are the more traditional correspondence study institutions and type II institutions are like the University of South Africa.

Type III institutions are independent study divisions within conventional colleges or universities. They may use a variety of teaching technologies and media.

Type IV institutions have their departure with a residential seminar or campus followed by independent study at home.

Type V institutions are represented by the Australian integrated mode. Here internal and external students are taught by means of independent study material and face to face instruction.

In Namibia people have to be "reached" due to its vastness. It is a large country - 823,144 square kilometres - with just over one and a half million people.

Furthermore, the country only has one university, the University of Namibia, which is situated centrally in Windhoek. Due to great distances and family responsibilities, attending full-time lectures is problematic for married and established adult students (Saunderson and Roman, 1993:2). This makes university education not easily accessible.

Beukes (1992:34) states in an article in the Nursing R.S.A., that affordable, accessible, equitable lifelong learning and training opportunities will have to be created for the professional nurse. This is necessary to keep her up to date with the latest developments and change in the medical and nursing fields.

She quotes a document drafted by the Department of National Education (South Africa). In this document it is stated that "... distance teaching as a mode of teaching, whether as an alternative, supplementary or supportive mode should be investigated.". The rationale for this view is that distance education is more affordable and accessible than the traditional contact education. Support for this view came from Prof. Reinecke, chairman of the Committee of University Heads, when he stated that distance teaching is the solution for students with financial problems. With this approach it is also not necessary to erect new universities (Reinecke, 1994:4). It is precisely this view that is tested so as to meet the needs of nurses in Namibia in a variety of aspects is so important.

Cragg (1991:257) states that distance teaching also has additional benefits, for instance it removes the constraints of time and place that nurses find difficult.

Apart from its academic value, it could also contribute to the resocialization of professional nurses (Cragg, 1991:260).

Distance education utilizes different modes as highlighted by Pym (1992:383) the modes of conducting distance education according to him are:

- * audio-conferencing by means a telephone
- * audiocassettes
- * television
- * written material like learning packages

To these could be added videos and computer software.

Nurse educators abroad have already successfully combined these different modes (see **Table 2.5**).

TABLE 2.5 GENERAL INFORMATION ON SELECTED NURSING COURSES OFFERED OVERSEAS BY DISTANCE TEACHING

COUNTRY	UNIVERSITY	COURSE INFORMATION	REFERENCE
United Kingdom	Robert Gordon Institute of Technology (RGIT)	- Course presented: Occupational Health Nursing - Modular approach	Lewis, Ellington (1991:316-318)
Canada	St. Francis Xavier University	- Courses presented: Nursing - Media: Voice Mail (Telephone based computer communication system)	Bernard, Naidu (1990:293-300)
Canada	University of Alberta (Edmonton)	- Course presented: Master of Nursing - Media: Video conferencing	Kerr (1988: 301-306)
Canada	Dalhousie University	- Course presented: Undergraduate - Media: Interactive television	Carver, MacKay (1986:19-28)
United States of America	Case Western Reserve University (Department of Family Medicine)	- Course presented: Gerontologic Home Care - Media: Computer assisted	Hekelman; Niles; Brennan (1994:106-109)
United States of America	University of New Mexico	- Course presented: Baccalaureus degree for registered nurses - Media: Institutional television via satellite	Shomaker (1993:153-158)
Australia & New Zealand (Collaborative effort)	Massey University, Palmerston (New Zealand)	- Course presented: Nursing Theory	Chick, Paull (1988:279-286)
Australia	LIVE-NET (A compressed video conferencing network)	- Course presented: continuing education in rural areas	Latchem, Raply (1992:118-130)
Sweden	Swedish Educational Broadcasting Company and Hermods (Correspondence School)	- Course presented: Study programmes for nurses	Flinck & Flinck (1985-conference paper)

With regard to the utilization of distance education in nursing, South Africa set the pace by the development of degree courses for nurses in 1975. As an example it can be shown that the "Open University" in England with a student enrolment greater than UNISA, offers no course that will lead to registration in Nursing. There is,

however, cooperation on a small scale with the "Royal College of Nursing". This provides some modules for post-registration courses by means of distance education for the University of London.

At the University of South Africa the total registrations in the department of Nursing for 1989 amounted to 8,075 (Beukes, 1990:65).

The University of South Africa (UNISA), through the Department of Nursing, also provides the opportunity to engage in indepth studies in specialised nursing courses which include critical care nursing aspects.

The expertise in the field of distance education in nursing is thus available in Southern Africa. It is possible to liaise with these nursing educators.

For this study an applicable mode has to be selected and the different modes were compared with each other to identify the most suitable mode (see Table 2.6).

TABLE 2.6 DISTANCE EDUCATION MODES

TYPE	DEGREE OF STUDENT/ LECTURER INTERACTION	FINANCIAL CONSIDERATION
Audio-conferencing	***	■ ■
Television	*	■ ■ ■
Written material: - Modules - Learning Packages	**	■
LEGEND IN RESPECT OF * AND ■: * Passive - very little interaction for student ** Possible for student/lecturer interaction on pre-arrangement *** Constant student/lecturer interaction ■ Does not need to be very expensive ■■ Moderate expensive ■■■ Very expensive		

Each of the modes mentioned in **Table 2.6** will be explained in more detail.

2.2.5.1 Audio-conferencing

With audio-conferencing the lecturer and a student or a group of students can simultaneously communicate with each other.

What is required is ready access to a telephone or a strategic area where there is an equipped tele-conferencing centre.

The University of Namibia has a "Centre for External Studies". Through this Centre distance education programmes are offered, but at this stage it is mostly done by means of distribution of printed material.

Ansere (1993:10) from this Centre, plans to initiate teleconferencing at different centres in Namibia.

The proposed short course being developed by the researcher could benefit by using such facilities, but the distribution of teleconferencing hospital centres in a country with poor high-tech communication facilities would be problematic. The need is so great that there is no sense in waiting for sophisticated means to be available. It appears that the most realistic approach would be the written word with subsequent re-enforcement in each hospital by means of simple topic discussion sessions for all registered nurses, as well as the enhancement of discussions between neighbouring hospitals.

This concept of "written material only", is not unknown, as there are distance education institutions in developed countries who prefer to use the printed media only, such as the Athabasca University in Canada (Ansere, 1993:9).

2.2.5.2 Television

Television is a powerful medium of instruction. Unfortunately, due to the costs involved, and complexity, universities in less developed countries do not utilize this electronic medium. Furthermore, in Namibia, television only reaches about 32 % of the population.

At this point in time television is not suitable as a method to convey information on critical care nursing due to:

- * Costs
- * Low reachability by television to homes of the population

However, most hospitals are in possession of a television and a video machine. Suitable videos could be prepared on relevant topics and be lent to these hospitals where candidates for short courses are employed. This would be a more cost-effective approach than providing the programmes as part of the general television service.

As has been mentioned that, due to the cost factor, television is not regarded as a suitable medium to convey programme content. In South Africa, however, there is

utilisation of television, but with new approaches to minimize costs.

Snyman (1995:199) described some proposals in the South African Journal of Higher Education to minimize costs. They are:

- * Using digital transmission technology. In this manner video images might be transmitted over telephone lines. This is called the video phone technology.
- * Solar power generation systems may be used. A number of systems are being marketed in South Africa.
- * Use existing lecture halls from which to broadcast.
- * Utilizing Multipoint Microwave Distribution Systems (MMDS) together with digital transmission. A powerful feature of the MMDS transmission system is that even domestic television sets could receive the signal if a small electronic addition is made to the set. All that is needed is an integrated square plate antenna and frequency down convertor.

Snyman (1995:202) estimated the costs to range from R5000 (for a TV set and feedback audio equipment) to about R25,000 for a video projector and audio feedback equipment. A Multipoint Microwave Distribution System (MMDS) flatplate antenna could be bought for approximately R800. Such costs prohibit the finance-strapped hospitals from utilising this system.

2.2.5.3 Radio

Radio has for quite a long time been used in distance education. In South Africa the University of South Africa has utilized this method with great success. Contributions from the department of nursing were also broadcast.

In Namibia, Ansere (1993:10) strongly advocates the use of the radio because this network covers 90 % of the total population of Namibia.

This communication medium could be used for this projected specific short course, provided that enough participants enrol, the cost at this stage is also high, unless the state is prepared to finance radio education programmes or sponsors are found for the programme. Sponsors do not favour programmes that will not be aimed at a large number of students.

2.2.5.4 Written material (printed media)

Written material as a technique used in distance education may be called different names such as:

- * Guides
- * Modules
- * Learning packages

The term used by the researcher is learning packages and will be discussed as such.

Learning Packages

Learning packages were utilized as the technique to convey the information to the participants.

Learning packages (study guides) may be viewed as:

- * Guides
- * Self contained structures

Where learning packages are only regarded as "guides", it only gives direction towards the knowledge to be learned. The student has to search from a multitude of sources that have been prescribed to him/her. This causes the student to turn from one source to the other to enable him/her to organise his information. This frequently discourages students who do not have ready access to literature, such as occurs in distant centres (Searle, 1995: Information on early years in distance education for nurses at UNISA).

This method relies on Ausubel's "Model of Advanced Organisers". This model assumes that the student has acquired substantial experience in the techniques of learning (Ansere, 1993:14).

The researcher accepted this assumption based on the fact that all participants had

already successfully completed a post-secondary basic nursing education programme, but the factor of availability of reference material remains.

A "self-contained" study guide (learning package) on the other hand consists of a wide range of information that a student might require to meet his objectives.

With the development of the learning packages a structured process was followed (see Diagram 3.2, Chapter 3). The process of development of the learning packages will thus not be discussed in this chapter.

(a) Topics included in the learning packages

The development process of the learning packages is discussed in Chapter 3. The topics of themes which were implemented in this study project were identified by means of the Delphi Technique which is explained in Section 3.2.1.1.

It was, however, necessary to compare it with international trends in nursing as well as with content being dealt with in related fields, especially the paramedical personnel.

The comparison was very broad and trends were basically equated with topics, themes or content.

The medical professions' outline was used as a term of reference. Confirmation was sought on what situations were regarded as "life threatening" by them. This, however,

provides only a broad guide as "life threatening" has a much wider range than the ten topics selected by the peer group in nursing.

Table 2.7 provides an outline of this comparison. It is important to note that this comparison in **Table 2.7** is by no means complete.

TABLE 2.7 COMPARISON BETWEEN THE MEDICAL, NURSING AND PARAMEDICAL PROFESSIONS WITH REGARD TO TOPICS, THEMES AND CONTENT ON LIFE THREATENING SITUATIONS AND AN OUTLINE OF THE CHOICES OF THE PEER GROUP UTILIZED IN THIS RESEARCH PROJECT

MEDICAL PROFESSION	NURSING PROFESSION: INTERNATIONALLY	PARAMEDICAL PROFESSION	PEER GROUP SELECTION OF TOPICS FOR THIS RESEARCH PROJECT	COMMENTS
Cardio-vascular: * Resuscitation - Basic & advanced * Heart failure * Acute hypertension	As for the medical profession	As for the medical profession	* Basic life support * Advanced cardiac life support (see Comment no. 1)	1. The researcher acknowledges that basic life support & advanced cardiac life support is the essence in the cardio-vascular systems
Respiratory: * Respiratory failure * Respiratory obstruction * Adult Respiratory Distress Syndrome (ARDS) * Acute asthma * Fat embolism * Aspiration Syndromes * Chest injuries	As for the medical profession	As for the medical profession	See Comment no. 2 * Chest injuries	2. During the interventions of any of these emergencies, knowledge & skills on basic life support & advanced life support would be life-saving initially
Gastro-intestinal: * Acute gastro-intestinal bleeding	As for the medical profession	As for the medical profession	See Comment no. 3	3. Knowledge & skills in management on shock would initially be sufficient
Neurological: * Head injuries * Tetanus * Status epilepticus	As for the medical profession	As for the medical profession	* Head injuries * Status epilepticus	

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Respiratory: * Respiratory failure * Respiratory obstruction * Adult Respiratory Distress Syndrome (ARDS) * Acute asthma * Fat embolism * Aspiration Syndromes * Chest injuries	As for the medical profession	As for the medical profession	See Comment no. 2 * Chest injuries	2. During the interventions of any of these emergencies, knowledge & skills on basic life support & advanced life support would be life-saving initially
Gastro-intestinal: * Acute gastro-intestinal bleeding	As for the medical profession	As for the medical profession	See Comment no. 3	3. Knowledge & skills in management on shock would initially be sufficient
Neurological: * Head injuries * Tetanus * Status epilepticus	As for the medical profession	As for the medical profession	* Head injuries * Status epilepticus	

Endocrine disorders: * Diabetic emergencies * Thyroid emergencies	As for the medical profession	As for the medical profession	* Diabetic emergencies	
Obstetrical emergencies: * Pre-eclampsia & eclampsia * Amniotic fluid embolism * Severe obstetric bleeding	As for the medical profession (see Comment)	As for the medical profession	See Comment no 4	4. Critical care nursing textbooks do not address these topics at all, but they are included in accident & emergency nursing care textbooks
Others: * Burns * Near drowning * Drug overdose * Envenomation * Abdominal & pelvic injuries * Shock * Spinal cord injuries	As for the medical profession (see Comment)	As for the medical profession	* Burns See Comment no 5	5. Not all critical care nursing textbooks include burns and basically none include envenomation
REFERENCES	REFERENCES	REFERENCES	REFERENCES	
* Marini & Wheeler (1989:xi) * Oh (1990:vii-ix) * Rippe, Irwin, Alpert & Fink (1991:v-ix)	* Alspach (1991: xv-xxii) * Caine & Bufalino (1988:xiii) * Dolan (1991:xxvii-xxxii) * Kinney, Packa & Dunbar, (1988:vii-x) * Kitt & Kaiser (1990: xi-xv) * Thelan, Davie, Urden & Lough (1994:xvii-xxii)	*Begley (1995:Personal conversation) * Caroline (1986:vii) * The South African Medical & Dental Council (1994:20-67)	* Chapter 3, Section 3.2.1.1	

It can be seen from the comparison that the peer group managed to identify at least one topic from each of the major systems as utilized by the medical profession.

It is the view of the researcher that obstetrical emergencies is an omission on the part of the peer group, especially as there is evidence as shown by the high percentage of disciplinary actions by the Nursing Board of Namibia during April 1995 which dealt with misconduct and neglect in the field of obstetrics (Personal knowledge of the researcher). This omission is serious in that obstetric emergencies involved two or more lives and the nurse/midwife has to act rapidly to prevent loss of both. Births occur in every area of the country and maternal health care issues are dealt with at every health care facility.

Apart from the above-mentioned, the peer group had a limited choice in that only ten (10) topics had to be selected or identified by them and one (1) which the researcher added. Given this limitation and the comparison as illustrated in **Table 2.7**, they did manage to identify the crucial topics to deal with life threatening situations.

In addition to information contained in **Table 2.7**, there was also a study done on the rural critical care needs by Thompson and Chambers (1993:173) in the United States of America. The three most pertinent needs, in order of priority, were:

- * Maintenance of critical care nursing skills in a low volume/low activity environment.
- * Nursing education with content appropriate to rural needs.

- * Motivation of critical care nurses in rural and small hospitals.

This research project is also addressing this issue in the Namibian context, as there are similarities with Thompson and Chambers' (1993:173) findings. This was done by:

- * Involving a peer group to select topics (themes) that are regarded as essential to intervene in life threatening situations (see Chapter 3, Section 3.2.1). Members of the peer group were from the rural areas or small hospitals.
- * An incentive is provided in the form of a certified statement (document) of successful completion which will be issued by the Department of Nursing at the University of Namibia.

2.2.5.5 Factors to be taken in consideration when designing instructional media

(a) Audience characteristics

Cranton (1989:15) stated that it is first necessary to describe the audience. Aspects which she mentioned are:

- * Educational level
- * Age or age range
- * Prior knowledge of the subject
- * Previous experience
- * Mother tongue

The "age" aspect was taken in consideration and discussed in Section 2.2.4.

The other aspects of Cranton (1989:13) were taken into consideration by the researcher.

All the participants in the study project were registered nurses with at least a three (3) year training after twelve (12) years of schooling.

They all had prior knowledge of the content being dealt with in the learning packages although not at the depth provided for in the learning packages.

Due to registration requirements of the then South African Nursing Council, all of the participants would have circulated through intensive/critical/emergency units as part of their clinical learning experiences.

As the official language is English, this could create learning problems for the participants, as this is not the mother tongue of the majority of participants.

To be able to benefit from a distance education course, the students and, in this case, the participants must have the ability to read "meaningfully". They must be able to see meaning in what they read and also be able to distinguish and differentiate between concepts.

Searle (1995) in a personal conversation mentioned that this "lack" of reading and learning skills creates problems especially during the evaluation phase. According to

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Searle (1995) in a personal conversation mentioned that this "lack" of reading and learning skills creates problems especially during the evaluation phase. According to

her "... students (participants) must be able to *comprehend* correctly, before they can give meaningful answers to multiple choice questions which tests comprehension."

In this research project, the participants' pre- and post-tests consisted of multiple choice questions (see Annexure C).

However, in a study by Jiya (1993:82) it was found that students whose first language is not English, do not always contribute their learning problems to English per se. A survey was done where 155 first-year B.Sc. students were required to indicate if English as medium of instruction was a stumbling block. Sixty nine (69) percent said no while seven (7) percent were uncertain.

That the issue of "language" as a critical factor can not be disregarded is quite evident. In another study Badenhorst, Foster and Lea (1990:43-46) have found that language proficiency is a factor in academic success for first-year Psychology students at the University of Cape Town.

This implies that material presented to the participants have to be easy readable.

(b) **Supporting reading material**

In developing countries, like Namibia, there is a scarcity of libraries and books, and if books are available, they are expensive. This causes difficulty for the students in obtaining textbooks (Ansere, 1993:15).

It is also not always possible to recommend readings in journals or materials from foreign publishers since the students (participants) in rural areas may not have access to specific journals or materials. Required readings *must* be available to all students (Billings, Marriner and Smith, 1986:34).

One solution would have been to compile "self-contained" study guides with all necessary information included. This research project, however, utilized a study guide which only served as a guide where the student (participant) had to move from one source to the other in order to organise his/her information. This approach relies on Ausubel's "Model of Advanced Organisers" (Ansere, 1993:14).

It was therefore necessary to supply supplementary reading material (see Chapter 3, Section 3.8.3).

This solution was also utilized by the Department of Nursing at the University of South Africa, which issued reading material to their students (Searle, 1995, in a personal conversation and reading material received by the researcher as a student at the University of South Africa).

(c) **Logistic problems**

As can be seen from **Table 1.2** in Chapter 1, twenty two (22) percent of rural patients live more than twenty (20) kilometres away from a health facility and the mean period to reach these facilities is about 72 minutes.

This means that patients with life threatening conditions in rural areas, if they survive, are admitted in a worse condition than if they had been admitted to an urban hospital. The chances therefore increase many fold that they might need transfer to a urban hospital where more sophisticated equipment and treatment is available.

For this, ambulances and paramedical personnel are needed which, as has been shown in Section 1.2.4 (Chapter 1), are not available.

This implies that the nurse has to provide this service. However, this is not even always possible, as Mrs Barlow (Deputy Director: Division Nursing Services) has pointed out because transport is not available (Personal Report: Barlow, 1995).

In the United States of America a survey by Thompson and Chambers (1993:174) indicated that most small rural hospitals use critical care nurses to accompany patients during transport. This is of fundamental life-saving importance.

The topics (themes) covered in the learning packages of this research project can prepare a registered nurse to accompany a patient during inter-facility transfers.

(d) **Site Coordinators**

To achieve quality nursing education at a distance, support for the learners is required.

Armstrong and Sherwood (1994:175-177) stated some of the appointment requirements

for site coordinators, namely they:

- * Should have the same qualifications as on-campus faculty members.
- * Should have knowledge of local educational needs, learning styles and area resources.

In this research project, only one (1) of the three (3) site coordinators had the same qualification as the researcher, namely a post-basic qualification in critical care nursing. All the site coordinators had knowledge of the local educational needs and area resources.

2.3 CONCLUSION

The planning and implementing of the self study learning packages were initiated as a follow-up of a previous research project by the researcher in order to develop nursing care standards.

The literature review revealed that through continuing education these standards could be achieved. The way to accomplish this in a third world country like Namibia is through distance education.

The distance education method has to take in consideration the characteristics of the participants (students), in this case adult female learners. The literature review showed this method to be suitable, taking into consideration their responsibilities with regard

to employers, families and distance(s) away from the academic setting.

Motivation is an essential part of successful study and incentives for completed study courses had to be provided. The increasing practice internationally of building up credits towards certification of some kind is an issue that must be kept in mind to meet the learning needs of nurses in Namibia.

Finally, the literature also indicated that distance education courses for nurses have been a viable option for resident university programmes, and that it might also be successfully utilized in critical care nursing.

CHAPTER 3

METHODOLOGY OF THE STUDY

3.1 INTRODUCTION

In this chapter an explanation is given of the method that has been utilized during the research project.

The framework is that of an experimental design, but this was preceded by some non-experimental ascertainties of the facts on which the experimental programme had to be based.

The problem identification and the areas of critical concern had to be established before the experiment could be devised.

For this reason, the methodology was conducted in two phases, namely:

Phase A, the pre-experimental phase; and

Phase B, the experimental phase.

3.2 PHASE A

Preparation of the material to be used in the experimental design

This stage involved a number of sub-phases which will be described.

3.2.1 IDENTIFICATION OF THE INDEPENDENT VARIABLE TO BE MANIPULATED

The first objective of this research project was:

"To identify, by means of peergroup assessment, the critical and life-threatening situations for which standards have to be designed"

Registered nurses with an additional qualification in critical (intensive) care nursing were approached to identify life threatening situations every nurse should be able to recognise and also be able to deal with. This was done by means of the Delphi Technique.

3.2.1.1 The Delphi Technique

The Delphi Technique is viewed as expert sampling by Wilson (1989:261). This view is supported by Treece and Treece (1986:367) who also state that it is a useful method for long-range forecasting and quantifying expert judgements, Polit and Hungler (1991:356) also support this approach.

The Delphi Technique was conducted during July 1993 and October 1993.

For the first round ten (10) registered nurses with a qualification in critical care nursing were contacted. They were representative of the whole of Namibia (see Table 3.1).

They were asked to identify fifteen (15) topics (themes) on life-threatening situations in which every registered nurse should be knowledgeable and skilled. This knowledge and skills was regarded as basic knowledge.

Only six (6) replied and they were included in the second round. In this round they had to select ten (10) topics from a shortlist of fifteen (15). They were to place these ten (10) topics in order of priority.

Table 3.1 PARTICIPANTS IN THE DELPHI TECHNIQUE

HOSPITAL	NUMBER OF PERSONS CONTACTED	NUMBER OF PERSONS RESPONDED
Oshakati State Hospital	3	1
Windhoek State Hospitals (Central & Katutura)	3	2
Caprivi State Hospital	1	0
Medicity Private Hospital (WBK)	2	2
Catholic Private Hospital (WBK)	1	1
TOTAL	10	6

The ten topics (themes) that were selected are:

- * Basic Life Support
- * Advanced Cardiac Life Support
- * Shock

- * Chest Trauma
- * Burns
- * Head Injuries
- * Spinal Cord Injuries
- * Seizures
- * Diabetic Ketoacidosis
- * Recovery Room Nursing

An additional topic, "Selected Legal and Ethical Issues", was added by the researcher. This is in line with content in short courses offered in the Republic of South Africa (The South African Nursing Council; Policy and Procedure in Respect of Short Courses: Proposed Guidelines, 1989: Annexure 2).

After these topics (themes) were identified, learning packages were to be constructed, for which a review panel of nursing experts was necessary.

3.2.2 THE PEER REVIEW PANEL

After the participants in the Delphi Technique identified the relevant topics (themes), nursing specialists in these topics (themes) were approached by the researcher. They were to act as the peer review panel.

This panel consisted of the following persons:

- * One registered nurse with a post-registration qualification in critical (intensive) care nursing
- * Two registered nurses with post-registration qualifications in critical (intensive) care nursing and nursing education
- * One registered nurse with a post-registration qualification in nursing education and operating room nursing (knowledge necessary for recovery room nursing - Learning Package no. 10)
- * One registered nurse with a masters degree in psychiatric nursing (knowledge necessary for Learning Package no. 8 - Seizures)
- * One registered nurse with a post-registration qualification in orthopaedic nursing (knowledge necessary for spinal cord injuries - Learning Package no. 7)

The two registered nurses with post-basic qualifications in both critical (intensive) care nursing and nursing education also participated in the Delphi Technique as well as in the peer review.

Apart from these two persons, the participants of the Delphi Technique and the peer review panel were two separate groups.

The peer review panel was involved in the development phase of the learning packages which followed on the identification of the essential topics by the Delphi panel.

Their role was to:

- * Participate in the development of the learning packages (Annexure G:1=11)
- * Contribute to the development of:
 - the pre- and post-tests (Annexure C)
 - the Biographical and Career Information form (Annexure F)
 - the course (Learning Packages) evaluation form (Annexure D)
 - the Product Evaluation form (Annexure E)
- * Participate in the testing of these instruments (Annexure G, F, D and E)
- * Participate in the pilot study of the learning packages

3.2.3 THE DEVELOPMENT PHASE OF THE LEARNING PACKAGES AND INSTRUMENTS

These activities are explained in sequence and the function (role) of the peer review panel is indicated.

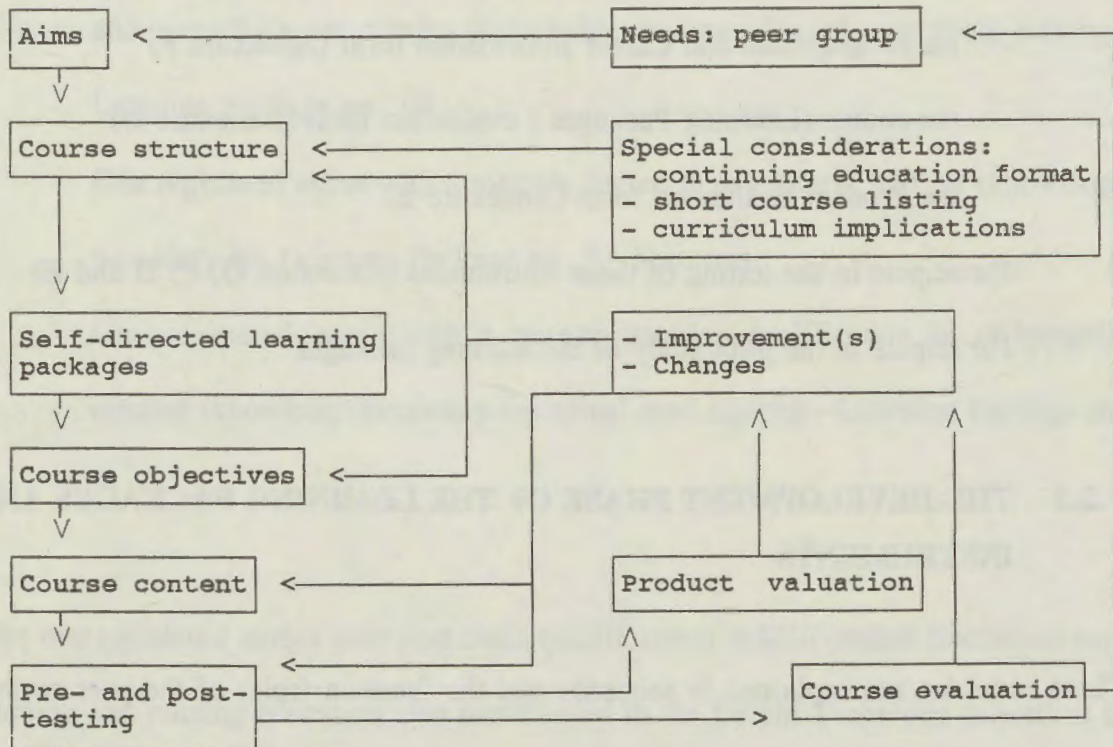
3.2.3.1 Development of the learning packages

The development of the learning packages was based on the identified topics by the peer group during the Delphi Technique.

The researcher compiled a draft for each of the eleven packages and submitted it to the respective nursing specialists of the peer review panel.

This was done on a one to one bases. After their review and input were completed, the final packages were prepared (Annexures G:1=11).

DIAGRAM 3.1 DEVELOPMENT PROCESS OF SELF DIRECTED LEARNING PACKAGES



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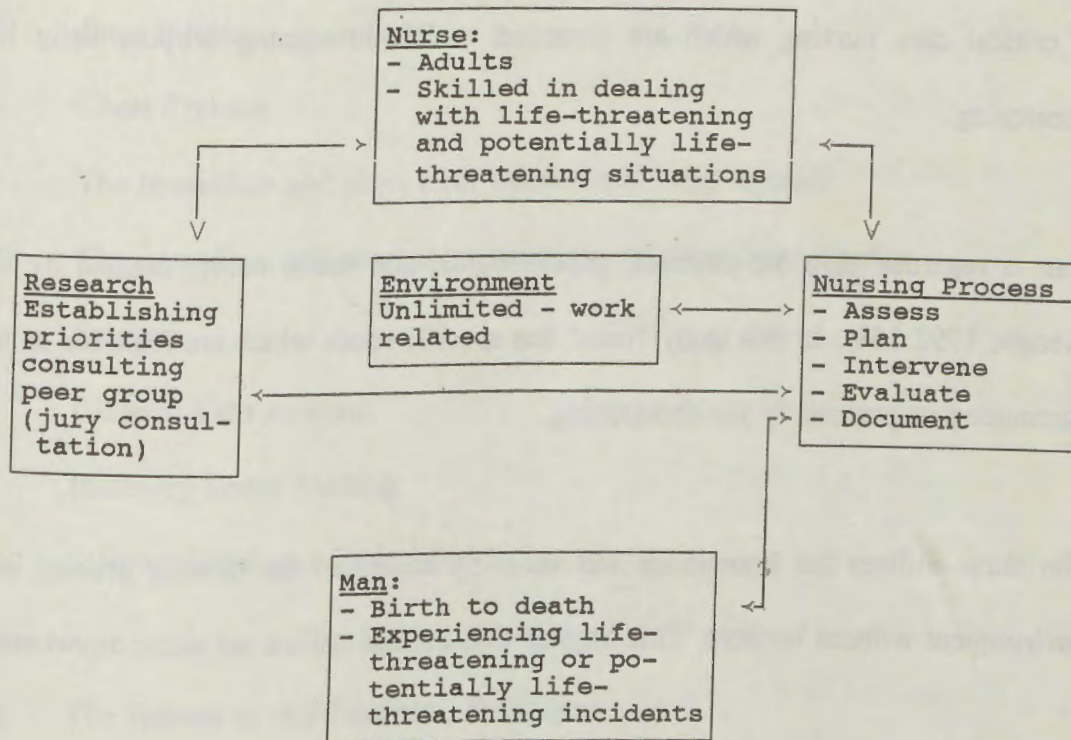
Planning, designing and developing an assessment tool for a 12 week accident and emergency module as part of a pre-registration course: Practical account Nurse Education Today 12(5), p. 357-367

(a) **Conceptual framework of the Packages**

The conceptual framework has to link the educational programme (learning packages) to the expectations expressed by the society, therefore it has to be accountable (Keogh, 1992:166).

It is based on the philosophy of the institution presenting the curriculum to the students (Keogh, 1992:166).

**DIAGRAM 3.2 CONCEPTUAL FRAMEWORK
DISTANCE EDUCATION PROGRAMME
LEARNING PACKAGES**



Adapted from Keogh (1992:168).

Explanation

This conceptual framework represents the concepts "nursing" and "nursing education" as contained in the distance education short course. The concepts contained are:

* The nurse

- * Man
- * The nursing process
- * The environment

In this framework the nurse is viewed as knowledgeable and skilled in selected aspects of critical care nursing which are regarded as life-threatening or potentially life-threatening.

Man is regarded as a bio-physical, psychological and social being, created by God (Keogh, 1992:168). In this study "man" has specific needs which are regarded as life-threatening or potentially life-threatening.

The nurse utilizes her knowledge and skills by means of the nursing process in an environment without borders. This implies that she can utilize her skills anywhere.

Research is necessary to identify new or other aspects of importance to the nurse in order for him/her to render emergency care in life-threatening and potentially life-threatening situations.

(b) **Themes of the Learning Packages**

The themes (topics) for inclusion in the learning packages have been decided on by the peer group by means of the Delphi Technique, with the addition of one topic included by the researcher.

The topics that were selected are:

- * Basic Life Support
- * Advanced Cardiac Life Support
- * Shock
- * Burn Injuries
- * Chest Trauma
- * The immediate and short term treatment of head injuries
- * The immediate and short term treatment of spinal cord injuries
- * Seizures
- * Diabetic Keto Acidosis
- * Recovery Room Nursing
- * Selected Legal and Ethical Issues

(c) **The format of the Learning Packages**

The principles applied in the format are basically universal. There are small variations, but the main elements are:

- * Table of Contents
- * Introduction
 - Purpose
 - Terminal objective
 - General directions

- * Pre-requisite
- * Instructional objectives
- * Pre-test
- * Resources
- * Activities
- * Self-evaluation of progress
- * Post-test
- * Feedback on module (Learning Package)

(De Tornay and Thompson, 1982:149).

These elements are also proposed (with small variations) by Mellish and Brink (1986:127, 128); De Young (1990:123) and Quinn (1991:223, 224).

Each of these elements will be explained and their relation to the current research project (see Annexure G for Learning Packages).

Table of Contents

All the packages contain a Table of Contents. This is in line with proposals from the literature.

Introduction

The Introduction contained information with regard to the purpose. General directions

were spaced throughout each learning package.

List of pre-requisites

Packages two to eleven all contain pre-requisites. The packages were presented in such a manner that some learning packages serve as pre-requisites for subsequent packages.

Instructional objectives

Objectives with regard to:

- * knowledge;
- * skills (where applicable); and
- * attitudes (where applicable), were stated.

Objectives where possible, were also stated beyond simple recall.

The objectives were matched with the content and pre- and post-evaluations, in which the peer group were involved.

In the preparation of the packages, pre- and post-test content was omitted as this content was contained in Annexure C. The participants received the test instrument (Annexure C) *beforehand*, and again *after* completion of the packages. This pre-test and post-test (the same test) was utilized to test the research hypotheses (see Paragraph 3.2.3.2 (a)

for a discussion on the development of this instrument).

Resources

A list of possible accessible reading material was supplied. The rationale for the selection of reading material was that the textbooks or manuals should be reasonably obtainable. As it is only the nursing library in Windhoek which is adequately stocked with nursing and medical textbooks, a "conservative" approach was followed.

To rectify the drawback with regard to the lack of libraries, reading material for each learning package was compiled by the researcher. One copy each of the reading material bundles was sent to the co-ordinator in each hospital participating in the research project. A total of eleven bundles was prepared.

The rationale was that this one copy of reading material should represent a copy of a textbook. The users had to use this reading bundle in the same way as they would have used the material available in a library.

Activities

Where possible, applicable learning activities were included. To prevent the utilization of only the written word, activities have to be included (see also: Presentation of packages).

Self-checks of progress

All the packages included self-evaluation questions.

(d) Feedback on learning packages

Part of the research consisted of evaluation of the learning packages by the participants (see Annexure D). The revised learning packages, based on this participant evaluation, will also contain an evaluation instrument, due to the fact that the development of learning packages is a continuous process that needs constant updating and changing.

(e) Course objectives and course content

The compilation of the objectives and the selection of the relevant content was based on the topics that were selected by the peergroup.

The objectives and content were compared with programmes for the paramedical professions which concentrate on life-threatening situations. The planned objectives and content equalled these standards.

The assumption is that the registered nurse should possess all the theoretical knowledge a level 8 paramedic has, without the additional skills acquired in their special courses such as is required for their different rescue certificates. The knowledge and skills requirement for a level 8 paramedic includes for example the following content and

procedures:

- * Basic and Advanced Cardiac Life Support
- * Management of Shock
- * Management of Burns
- * Management of Head Injuries
- * Management of Spinal Cord Injuries
- * Endocrine Emergencies
- * Chest Trauma, etc.

(The South African Medical and Dental Council, 1994:1-67).

With a search through the literature, the needs of rural critical care nurses in the United States of America in 1989 revealed the following needs:

- * Hemodynamic monitoring education
- * 12 lead E.C.G. analysis
- * Advanced arrhythmia recognition
- * Caring for patients on the ventilator

(Thompson and Chambers, 1993:173).

These needs are in accordance with what the peer group in Namibia has identified. Advanced cardiac life support and shock cover the first three needs.

(f) **Presentation of the Learning Packages**

The learning packages were delivered by mail or by hand depending on the distance involved.

The length of the study period of ten (10) weeks was decided upon after the volume of content to be mastered had been evaluated and compared with a single subject course at university level.

Although the packages were offered through the mechanism of distance education, the following complemented the written word of the learning packages:

* Tutor (lecturer) contribution.

(The researcher lectured the same material on *one* package to all the participants)

* Simulation apparatus was utilized for arrhythmia recognition for all participants.

These two complementary activities will be recommended by the researcher if the learning packages prove to be successful and if a system of distance education for critical care nursing is instituted.

3.2.3.2 The development of the different instruments

Four instruments were developed with the help of different members of the peer review

panel.

(a) Development of an instrument to test pre- and post-experimental knowledge

The development of the instrument was based on the following hypothesis:

Null hypothesis:

- * There will be no difference in the scores obtained between the pre-tests and the post-tests of the registered nurses who have studied the learning packages (H_{0_1})
- * "There will be no difference in the final post-test scores between the registered nurses who have studied the learning packages and registered nurses who have not studied the learning packages" (post-test) (H_{0_2})

Alternative hypothesis:

- * Registered nurses who have studied the learning packages will have a significantly higher score in their post-test than in their pre-tests (H_{1_1})
- * "Registered nurses who have studied the learning packages will have significantly higher post-test scores than registered nurses who have not proceeded through the learning packages" (post-test) (H_{1_2})

A multiple choice questionnaire consisting of one hundred (100) questions was compiled to test these hypotheses (see Annexure C).

These questions tested the content of the eleven packages and had to be completed

within three (3) hours. See Table 3.2 for an outline of the percentage of questions asked on each learning package (also see Chapter 2).

Table 3.2 PERCENTAGE OF QUESTIONS FROM EACH OF THE ELEVEN PACKAGES INCLUDED IN THE TESTS

LEARNING PACKAGE	PERCENTAGE OF QUESTIONS ON EACH PACKAGE (%)
1. Basic Life Support	10
2. Advanced Cardiac Life Support	11
3. Shock	9
4. Chest Trauma	8
5. Burns	8
6. Head Injuries	10
7. Spinal Cord Injuries	10
8. Seizures	5
9. Diabetic Ketoacidosis	9
10. Recovery Room Nursing	10
11. Ethical and Legal Issues	10
TOTAL	100

The questions were based on the essential requirement that every registered nurse needs: "basic knowledge" in critical care to effectively intervene as an emergency or life-saving measure.

This concept of "basic knowledge" has been refined in different follow-up studies by Toth (1986:181-196). Her studies on this concept received national (United States of America) as well as international recognition as is evident in further publications like Toth and Dennis (1993:98-105).

Toth's project dealt with the quantification of basic knowledge with regard to the nursing care of critically ill patients. She provides a simple definition for basic knowledge:

"...is the information that is used to provide safe nursing care to patients. It is that knowledge necessary for nurses to have prior to their entry into critical care nursing practice and that becomes the foundation for job performance." (Toth, 1986:181-196).

The project ultimately led to the "Basic Knowledge Assessment Tool (BKAT)", for critical care nursing. This tool was tested by more than 1600 critical care nurses throughout the United States of America and other English-speaking countries (Toth and Dennis, 1993:98).

See Table 3.3 for a comparison between the BKAT and the test (Annexure C) compiled by the researcher.

Table 3.3 A COMPARISON OF THE BASIC KNOWLEDGE ASSESSMENT TOOL (BKAT) AND THE PRE AND POST TEST INSTRUMENT (ANNEXURE C)

	BKAT	INSTRUMENT NR 1 (ANNEXURE C)
Type of instrument	<ul style="list-style-type: none"> - Objective questions on critical care nursing - 100 Items 	<ul style="list-style-type: none"> - Objective questions on selected aspects of critical care nursing - 100 Items
Aim	<ul style="list-style-type: none"> - To measure knowledge (Toth and Dennis, 1993:98) 	<ul style="list-style-type: none"> - To measure knowledge
Topics (Themes)	<ul style="list-style-type: none"> - Cardiovascular nursing - Pulmonary nursing - Monitoring lines - Neurological nursing - Endocrine system - Renal system - Psychosocial aspects 	<ul style="list-style-type: none"> - Basic life support - Advanced cardiac life support - Shock - Chest trauma - Burns - Head injuries - Spinal cord injuries - Seizures - Diabetic ketoacidosis - Recovery room nursing - Ethical and legal issues
Reliability	<ul style="list-style-type: none"> - BKAT-1 .86 - BKAT-2 .86 - BKAT-3 .73 - BKAT-4 .88 	<ul style="list-style-type: none"> - 0.6-0.8
Validity	<ul style="list-style-type: none"> - Determined by panel of experts 	<ul style="list-style-type: none"> - Determined by panel of experts - Literature - field tested questions

(b) Development of the biographical and career information form (Annexure F)

The questions in this form concentrated on the participant's age, experience as a registered nurse, experience in critical care and emergency departments, as well as post-registration and academic qualifications.

This was done to correlate their performance with these variables.

(c) Development of the course (Learning Packages) evaluation form (Annexure D)

"Continuing education should maximize the nurse's own input so that they do not perceive it as to be imposed from the establishment." (Yuen, 1991:1236)

Part of the research project focused on the contribution of the participants in the refinement of the learning packages. The participants were registered nurses, and as Harrison (1992:183) has put it, they have extensive life and professional experiences. Their contributions were therefore needed and were obtained by means of an evaluative questionnaire on the packages.

The questions dealt with:

- * The quality of the objectives of the learning packages
- * The learning activities of the learning packages

- * The allotted time span
- * Identification of problems in the different learning packages
- * The need for the topics of the learning packages
- * Their knowledge level after completion of the packages
- * Their psychomotor performance after completion of the packages
- * Their confidence level after completion of the packages
- * An evaluation of the post-test

(d) Development of the Product Evaluation form (Annexure E)

An evaluation form was constructed to be used by mentors where the two experimental groups were employed.

This instrument (Annexure E) consisted of questions on the:

- * knowledge; and
- * skills

of the participants and were to be evaluated by the mentors after the participants had completed the packages (Groups A and C).

The instrument was constructed in such a way that the mentors evaluation of the participants knowledge, skills and confidence levels could be compared with the participants self-evaluation on these aspects.

3.2.3.3 Testing of the instruments

(a) Testing of the pre- and post-test instrument (Annexure C)

This instrument was tested for reliability and validity:

Reliability

Reliability refers to the accuracy (Treece and Treece, 1986:256) or consistency (Wilson, 1989:358) of an instrument.

Reliability is expressed as a coefficient. Reliability was determined by means of the *Kuder-Richardson Formula (K-R21)* on two groups.

With the Kuder-Richardson the result vary between 0,60 and 0,80 for the two different groups. The relative low reliability (0,60) can be attributed to the group with a low standard deviation.

Revision of the instruments were made using item analysis. This included the altering of the wording of stems and responses of four items.

The researcher is aware that true reliability can only be obtained after repeated use. In the development of the Basic Knowledge Assessment Tool (BKAT) it took five years and resulted in three versions by 1986 (Toth, 1986:186) and in four versions by 1993

(Toth and Dennis, 1993:103) and still improvements are being made. Even so, during the third version, the reliability only reached 0.73.

Validity

Validity is defined as an instrument's ability to help the researcher to actually test what it is supposed to test (Treece and Treece, 1986:283).

To determine the validity of the experimental instrument, the following procedure was followed:

- * The utilization of already field tested questions
- * The utilization of a jury (peer review panel)

Utilization of field tested questions

Questions: Twenty four percent of the questions were adapted from existing questions from the following sources:

- (i) Casparis, L. and Noone, J. Critical Care Examination Review
1990 Second Edition
Springhouse: Springhouse Corporation

- (ii) Williams, S. and Alspach, J.G. Core Review for Critical Care Nursing
1985 London: W.B. Saunders Company

Utilization of a jury (peer review panel)

The instrument (Annexure C) was also submitted to the peer review panel (see point 3.2.2).

After comparison with the field tested questions and review by the peer group, a high degree of validity was agreed upon with regard to:

- * Content validity: is concerned with the sampling adequacy of the content area being measured (Polit and Hungler, 1991:375). Both methods confirmed content validity.

Other criteria that were also confirmed by the peer review panel were:

- * Objectivity of the instrument due to the nature of the questions (objective multiple choice questions)
- * Comprehensibility
- * Simplicity

The instrument used during the pre-test was refined and used as a post-test.

The nature of the test (100 multiple choice questions) and the time-span between the pre- and post-tests (ten weeks) made it nearly impossible for respondents to remember their previous responses.

The time-allocation was 3 hours.

(b) Testing of the Biographical and Career Information form (Annexure F)

This instrument was submitted to members of the peer review panel.

They confirmed that it showed face validity and content validity as it correlated with questions asked in similar instruments (Toth, 1986:189-191).

(c) Testing of the course (Learning Packages) Evaluation form (Annexure D)

The items in this questionnaire were compared with similar course information in the literature. It showed content validity (Kopp, Schell, Laskowski-Jones and Morelli, 1993:118).

The questionnaire was also presented to members of the peer review panel who confirmed a high degree of content validity and added face validity.

(d) **Testing of the Product Evaluation form (Annexure E)**

This instrument was submitted to members of the peer review panel and they concluded that it has face validity.

The nature of the questions correlated with the instrument used by the participants for self-evaluation (Annexure D) and with descriptions in the literature. Thus content validity was established (Hast, No date:12-14).

(e) **Pilot study**

Treece and Treece (1986:382) define a pilot study as a small preliminary investigation of the same general character as the major study.

This is necessary to familiarize the researcher with the *problems* to be *corrected* in preparation of the larger research project.

For these reasons Polit and Hungler (1991:62) state that "...it is often advisable to carry out a pilot study.....".

Burns and Grove (1987:57) agreed with Treece and Treece (1986:382) and add that it is conducted to refine the methodology. They went on to say that a pilot study is conducted for *one* or *more* of the following reasons:

- * To determine the feasibility
- * To identify problems with the design
- * To determine whether the sample is representative of the population or whether the sampling technique is effective
- * To refine the data collection instrument
- * To refine the data collection and analysis plan
- * To give the researcher experience with the subjects, methodology and research instrument

Before conducting the pilot study, the researcher had to take the following aspects into consideration:

- * The packages in themselves involved a short course and aspects of curriculum design where expert (jury) input would be an advantage.
- * Volunteers had to study, and be evaluated on eleven topics, with no benefit for them. The benefit (proposed listing by the Nursing Board of Namibia) cannot be guaranteed, as changes had to be made in the presentation after the trial run.
- * There is a lack of a sizable population. If the volunteers of a pilot study have to be excluded, very few would be available to participate in the major study.
- * In the rural areas, a maximum of five (5) registered nurses were willing to participate. To enlist people for a pilot study as well as the main study would

have been problematic. These people are in constant contact with one another due to the small size of some hospitals and contamination of the results was a definite consideration.

* The participants in the project are experienced persons with certain skills and knowledge, and their contributions were sought to refine the packages, therefore they:

- formally evaluated the learning packages (Annexure D)
- their input was utilized in the refinement of the learning packages

Based on the definitions of Burns and Grove (1987:57) and Treece and Treece (1986:382), as well as the above considerations, it was decided to utilize the peer review panel in the pilot study.

The involvement and consultation of the peer review panel led to:

* **Confirmation of the feasibility of the study**

The panel included nurse educators with experience in distance education and the panel is familiar with the conditions of the country and the nature of the participants.

* **Acceptance of the design**

The members of the panel, especially endorsed the involvement of the participants in

evaluating the packages.

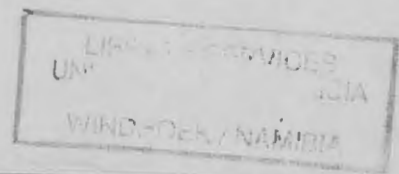
* **Refinement of the instrument.**

As has been explained in 3.2.3.1, the peer review panel was involved in the development of all the instruments.

The researcher is also a critical care nurse educator and has lectured for fifteen years to nursing students. Up to forty percent (40 %) of the participants were former students of the researcher. The researcher is familiar with the participants.

The main data collecting instrument is an objective test, an instrument with which the researcher is also familiar.

The peer review panel was thus involved in the whole pre-implementation phase, as well as in scrutinizing the design, developing of the packages, developing of the relevant instruments. Some members of the panel were also involved in the evaluation of the participants after completion of the project.



3.3 PHASE B

The implementing phase: conducting the experiment

The experiment was used to test:

the effectiveness of self-study learning packages on select aspects of critical care nursing as a method of increasing knowledge and skills.

This phase consists of the following stages:

- * Population and sampling
- * Pre-testing of the participants in the two experimental groups
- * Distribution of packages
- * The working phase of the packages
- * Post-testing of the participants
- * Evaluation of the packages by the participants
- * Evaluation of the participants by mentors or specially appointed persons.

3.3.1 Population and Sampling

The population consisted of registered nurses who were employed in selected private and state hospitals (see Table 3.4) and who were involved in clinical care on a specific day.

Ten (10) hospitals were contacted . Their selection were based on:

- * Availability of registered nurses.
- * Being the referral hospital or major district hospital in the region.

Walvis Bay at this point was omitted due to the fact that during the planning stage of the project Walvis Bay had just been integrated into Namibia.

All the regions were represented in this manner (see Table 3.4).

The two (2) private hospitals in Windhoek were selected as being the largest private hospitals with the most registered nurses.

A random allocation to the Solomon Four Group Design as reflected in **Table 3.4** and **3.6** and as described in **3.3.1.2**, **3.3.1.3** and **3.3.1.4**.

3.3.1.1 The Private Hospitals

A registered nurse in each of the two private hospitals in Windhoek was asked to act as coordinator after the nature of the research project had been explained to them.

These two coordinators recruited volunteers from the registered nurse population in clinical care on a specific day in each hospital. They explained the process to each participant.

When the volunteers were recruited, the researcher placed these two hospitals in either a control or an experimental group by means of lottery where the name of the first hospital drawn was allocated to the experimental treatment (see Table 3.4).

The allocation of hospitals to either an experimental or control group was to prevent the "Interaction between groups which might contaminate the results". (Treece and Treece, 1986:194).

3.3.1.2 The Windhoek State Hospitals (Central and Katutura)

The researcher contacted two coordinators in the Windhoek Central Hospitals and explained the research project to them. Together the researcher and the two coordinators recruited volunteers on a specific day to, participate from the total population of the Central Hospital and the Katutura Hospital. After the recruitments had been done, these two hospitals were randomly placed in an experimental and control group by means of lottery where the first drawn hospital was allocated to the experimental treatment (see Table 3.4).

This allocation was also based on the motivation to prevent interaction between groups and possible contamination of results.

3.3.1.3 The Oshakati State Hospital

This hospital is the referral centre of the north of the country where nearly half of the

population is located.

A liaison person (registered nurse) was appointed to recruit volunteers out of the total population of registered nurses in this hospital after he had been briefed about the procedure. These volunteers were then allocated by means of lottery to three groups, two experimental groups and one control group (see Table 3.4).

Since this is the only hospital in the north included in the experiment, it was necessary to have more than one group and at least one control group. For this reason the "post test only" control group was selected to minimize contamination of results.

3.3.1.4 The Smaller State Hospitals

The researcher classified the Katima Mulilo, Otjiwarongo and Keetmanshoop Hospitals as "small". The number of beds and the scope of their activities when compared with the two (2) regional hospitals at Windhoek and Oshakati respectively, warrant this classification.

Except for Keetmanshoop, the researcher had no contact person in these hospitals and the **Ministry** of Health and Social Services was approached for a list of personnel in these hospitals. A list of names of registered nurses was obtained. The researcher sent a letter of explanation to these persons as well as an agreement form, should they accept the invitation to participate in the experiment.

After the replies were received, one hospital was randomly selected to be a control hospital by means of lottery. The other two hospitals were utilized in the experiment (see Table 3.4).

Table 3.5 COMPARISON OF TARGET POPULATION AND SAMPLE

HOSPITAL	NUMBER OF PERSONS CONTACTED	NUMBER OF PARTICIPANTS WHO AGREED TO PARTICIPATE	PERCENTAGE OF PARTICIPANTS WHO AGREED TO PARTICIPATE (%)
Windhoek Complex: - Central - Katutura	22	17	77
Oshakati	20	15	75
Rundu	4	0	0
Katima Mulilo	5	2	40
Medicity (Private)	48	13	27
Catholic (Private)	40	9	22,5
Otjiwarongo	15	3	20
Grootfontein	8	0	0
Keetmanshoop	8	4	50
TOTAL	170	63	37

3.4 ETHICAL CONSIDERATION

Participants in the Windhoek area were personally visited by the researcher and the aims and methods explained to them.

To participants outside Windhoek area a letter of explanation was sent, as well as an agreement form, should they be willing to participate.

They were assured of confidentiality and anonymity in that they all drew a code number from a box. The numbers ranged from 1 to 75. The coordinator in the different hospitals knew the numbers, which applied to each person for subsequent distribution of the marks attained.

A separate list of numbers were sent to Otjiwarongo and Katima Mulilo. Participants drew a number and kept it.

3.5 PERMISSION TO CONDUCT THE RESEARCH

- * The research proposal was approved by the Faculty Board of the Faculty of Medical and Health Sciences.
- * Dr E. Burger, Head of the Research Committee, verbally provided permission on behalf of the Ministry of Health and Social Services.
- * Mrs A. Kotze, Nursing Manager, granted permission on behalf of Medicity Hospital (see Annexure I).
- * The Nursing Manager of the Roman Catholic Hospital verbally granted permission.

3.6 PRE-TESTING OF THE PARTICIPANTS

As has been described in point 3.3.1 (Population and sampling) the allocation of participants was done according to the random placement of their respective hospitals of employment. The only exception was Oshakati Hospital where three groups (A, C and D) were randomly selected. The Solomon Four Group Design was used (see 3.3.1).

The pre-test for participants of groups A and B was conducted during October 1994 (see Table 3.4 for distinguishing between different groups).

The format of the test is described under point 3.2.3.2.

The pre-test was conducted by coordinators in the Oshakati Hospital, Medicity Private Hospital and the Roman Catholic Private Hospital. The researcher conducted the pre-test in the Windhoek Hospital Complex (Central and Katutura hospitals).

The results are discussed in Chapter four.

Table 3.6 SOLOMON FOUR GROUP DESIGN

	MEASUREMENTS OF DEPENDENT VARIABLE(S)	MANIPULATION OF INDEPENDENT VARIABLE	MEASUREMENT OF DEPENDANT VARIABLE(S)
Randomly selected Experimental Group 1 (Group A)	Pre-test ----->	Treatment ----->	Post-test
Randomly selected Experimental Group 2 (Group C)		Treatment ----->	Post-test
Randomly selected Control group 1 (Group B)	Pre-test -----	----->	Post-test
Randomly selected Control group 2 (Group D)	-----	----->	Post-test
LEGEND:			
Treatment: under control of the researcher			
Findings: * Comparison of experimental and control groups			
* Comparison of post-test scores for pre-tested and not pre-tested groups			
* Comparison of pre-test/post-test differences in pre-tested experimental and control groups			
* Comparison of post-test scores of experimental and control groups (Burns and Grove, 1987:271)			

3.7 DISTRIBUTION OF THE LEARNING PACKAGES

The eleven learning packages were distributed to groups A and C. This was done as

follows:

* Packages no. 1-5 were sent by mail with a letter of explanation to:

- Oshakati
- Keetmanshoop
- Otjiwarongo

This was done during November 1994.

* Packages no. 1-5 were personally delivered at the private hospitals in Windhoek, as well as the Windhoek Hospital Complex (Central and Katutura). The process was explained to them.

* The following hospitals were visited by the researcher during the first and tenth of February 1995:

- Oshakati
- Keetmanshoop
- Otjiwarongo

During this visit the remainder of the learning packages were distributed (packages no. 6-11).

* During the period of 24 to 30 January 1995 the remainder of the packages (no. 6-11) were distributed to:

- Medicity Private Hospital
- Windhoek Complex: Central

Katutura

3.8 WORKING PHASE OF THE LEARNING PACKAGES

These eleven packages were offered as a distance education programme which implied the following:

Mastering of the content within ten (10) weeks

Personal contact and tutoring by lecturer (researcher)

Telephonic contact with lecturer (researcher)

Distribution of reading material by lecturer (researcher)

No financial expenditure by the participants

Post-testing of participants

3.8.1 Mastering of the content within ten (10) weeks

The time span of ten (10) weeks was decided upon after consultation with the peer review panel and comparison with the amount of work dealt with in an established single subject course in the Department of Nursing at the University of Namibia.

3.8.2 Personal contact and tutoring by lecturer (researcher)

According to Frindt and Venter (1993:51) there is an ongoing argument concerning the validity of offering a student support structure in distance education. This argument is based on the idea that the students have chosen this method for the purpose of being independent in their studies. They (Ibid) continue, however, by saying that experience internationally has shown that distance education support is necessary, especially in countries where students have been exposed to uncritical rote learning and passivity.

The researcher has based the approach for this distance teaching on two methods:

- * In the United States of America, Harrison (1992:186) has concluded that the telephone is a valuable support mechanism in distance education for registered nurses reading for a Bachelor of Nursing (BN) course. The researcher has emphasized his willingness to be contacted by telephone. In all eleven packages his telephone number was indicated (Annexure H).
- * Personal contact and tutoring. Quinn (1991:221) a well known British nursing educator writes that many distance education systems have some degree of tutorial support.

In this research programme the majority of topics were to some extent familiar to the registered nurses. However, the learning package on Advanced Cardiac Life Support (Learning Package no. 2) was new to the majority of participants

and also relatively complex.

This led to planned consultations and visits to all participants of groups A and C. During these visits and consultations actual lecturing and guidance was provided, for both the utilization of an arrhythmia simulator and monitor.

The lectures were conducted from 1-10 February 1995, at Oshakati, Keetmanshoop and Otjiwarongo. The sessions at each of these hospitals lasted approximately four (4) hours.

Lectures were offered at the private hospital in Windhoek (Medicity) regularly every Thursday, during February and March, until the researcher had established that all the participants had the opportunity to attend lecturing on the learning package on Advanced Cardiac Life Support.

The participants at the Windhoek Hospital Complex were contacted in groups of 2-3 during February and March 1995 and the material on Advanced Cardiac Life Support then presented to them. In this manner all participants were involved in planned consultations and the specific lectures provided by the researcher.

3.8.3 Distribution of reading material

Suitably equipped libraries are not available at the hospitals outside Windhoek. There

are no photocopy machines available at Keetmanshoop Hospital and during the visit to Oshakati, the participants mentioned that it is nearly impossible to use this hospital's machine as it is constantly out of order.

This prompted the researcher to compile reading material for each package (see Chapter 2; Section 2.2.5.5, (b)).

3.8.4 No financial expenditure by the participants

There were no costs involved for the participants.

Learning packages and reading material were sent free of charge. The costs were absorbed by the researcher.

The returning of completed tests and evaluations were done by means of the inclusion of pre-stamped envelopes.

3.8.5 Post-testing of participants

The post-testing was conducted at the end of March 1995.

In Windhoek, the participants wrote at the Nursing Library of the Faculty of Medical and Health Sciences. There was an invigilator present and the duration was 3 hours.

The exception in Windhoek was the Medicity Hospital. The researcher personally invigilated and conducted the testing at this centre.

In Oshakati, the librarian invigilated and in Otjiwarongo, the Nursing Manager.

In Oshakati, the participants also wrote in the library where an invigilator was present.

In Otjiwarongo, the students wrote the test under the supervision of the Nursing Manager.

The researcher collected the post-test in Windhoek and the tests outside Windhoek were sent by means of registered post.

CHAPTER 4**ANALYSIS AND DISCUSSION OF THE FINDINGS****4.1 INTRODUCTION**

This chapter focuses on the analysis of data obtained from the pre-experimental phase and the experimental phase. Some of the data of the pre-experimental phase, namely the Delphi Technique, is described in Chapter 3.

The results relevant to this chapter are presented in such a way as to first:

- * Describe the participants;

secondly to:

- * Evaluate their test results before and after completion of the learning packages.

Followed by:

- * Their evaluation of these learning packages and the working phase of the experiment;

and concluded by:

- * The evaluation results done by appointed persons on the performance of the experimental groups after completion of the learning packages.

The analysis of the results were done by means of the SPSS computer programme.

4.2 A DESCRIPTION OF THE PARTICIPANTS

Information on the participants was obtained by means of the instrument:

Biographical and Career Information

(Annexure F)

This instrument was to be completed by all participants.

Sixty three (63) registered nurses agreed to participate in the research project (see Chapter 3, Table 3.5).

Of the sixty three (63) who had agreed, only 71 % (n=45) completed the research project and only 63 % (n=40) returned this instrument on Biographical and Career Information.

There were ten (10) items in this instrument and they are discussed individually.

4.2.1 Coding

Item 1

Space was provided in this item for the participants to indicate their code. The numbers ranged from 1 to 75.

4.2.2 Random allocation to experimental groups

Item 2

As the participants were randomly allocated to any of four (4) groups according to the Solomon Four Group Design, this item was provided in order for them to indicate to which group they were allocated. Table 4.1 provides an outline of the random group allocation.

**Table 4.1 PRESENTATION OF PARTICIPANTS ACCORDING TO
THE GROUPS THEY WERE ALLOCATED TO
(N=45)**

GROUP	NUMBER	PERCENTAGE
Group A	19	42.2
Group B	9	20.0
Group C	6	13.3
Group D	11	24.4
TOTAL	45	100.0

Group A and C were the experimental groups who received the learning packages.

Groups B and D were the control groups. They did not receive the learning packages.

4.2.3 Gender distribution

Item 3

In Table 4.2 the gender distribution is indicated.

**Table 4.2 GENDER DISTRIBUTION OF PARTICIPANTS IN THE EXPERIMENT
(N=4)**

GENDER	NUMBER	PERCENTAGE
Male	2	5
Female	38	95
TOTAL	40	100.0

4.2.4 Participants' age

Item 4

**Table 4.3 AGE OF PARTICIPANTS
(N=40)**

AGE	NUMBER	PERCENTAGE
21 - 25 years	5	12.5
26 - 30 years	7	17.5
31 - 35 years	13	32.5
36 - 40 years	6	15
41 - 45 years	5	12.5
Above 45	4	10
TOTAL	40	100.0

Table 4.3 provides the age distribution of the participants. From this table it can be seen that the largest single group of respondents (28.8 percent, n=13) fell in the 31 to 35 year category.

In a study by Cragg (1991:258) she found that the age of registered nurses who have enrolled in courses offered by means of distance education at four universities, ranged from 25 to 55 years, with the majority in their thirties.

4.2.5 Information related to practical experience after completion of basic training in nursing

Item 5

In item 5 the years of practice since completion of their basic training by participants was determined. From **Table 4.4** it can be seen that 47.5 % (n=19) had more than seven years experience.

It therefore seems that a significant percentage of participants have a possible need for continuing education.

**Table 4.4 YEARS OF EXPERIENCE SINCE COMPLETION OF
BASIC TRAINING IN NURSING
(N=40)**

TIME	NUMBER	PERCENTAGE
< 2 years	2	5
2 - 5 years	12	30
6 - 7 years	7	17.5
> 7 years	19	47.5
TOTAL	40	100.0

4.2.6 Information related to experience in an intensive care unit or an emergency department

Item 6

As any experience in an intensive care unit or an emergency department could have had an effect on their performance, this item was included.

From **Table 4.5** it can be seen that 20 percent ($n=8$) of the participants had no experience while 27.5 percent ($n=11$) had more than two (2) years of experience.

**Table 4.4 YEARS OF EXPERIENCE SINCE COMPLETION OF
BASIC TRAINING IN NURSING
(N=40)**

TIME	NUMBER	PERCENTAGE
< 2 years	2	5
2 - 5 years	12	30
6 - 7 years	7	17.5
> 7 years	19	47.5
TOTAL	40	100.0

4.2.6 Information related to experience in an intensive care unit or an emergency department

Item 6

As any experience in an intensive care unit or an emergency department could have had an effect on their performance, this item was included.

From **Table 4.5** it can be seen that 20 percent ($n=8$) of the participants had no experience while 27.5 percent ($n=11$) had more than two (2) years of experience.

**Table 4.5 PERIOD OF EXPERIENCE IN AN INTENSIVE CARE UNIT
OR EMERGENCY DEPARTMENT
(N=40)**

PERIOD	NUMBER	PERCENTAGE
None	8	20
< 6 months	9	22.5
7 - 12 months	8	20
13 months - 2 years	4	10
> 2 years	11	27.5
TOTAL	40	100.0

As more than 60 percent (n=25) of the respondents had no more than one (1) year of experience in an intensive care unit or emergency department, participation in the experiment could have been of benefit to them. It must be noted that for the nurses in the rural hospitals this experience would be in emergency departments, rather than in intensive care units.

4.2.7 Academic profile

Three items (numbers 7, 8 and 9) dealt with this aspect.

4.2.7.1 Post-basic qualifications registered with the South African Nursing Council

Item 7

Table 4.6 displays the post-basic nursing qualifications of the participants.

An interesting finding was that 12.5 percent (n=5) of the participants held a qualification in Nursing Education, and 10 percent (n=4) held a qualification in Nursing Management.

Table 4.6 POST-REGISTRATION QUALIFICATIONS OBTAINED BY THE PARTICIPANTS (N=40)

QUALIFICATION	NUMBER	PERCENTAGE
Operating Room Nursing	2	5
Orthopaedic Nursing	0	0
Community Health Nursing	9	22.5
Psychiatric Nursing	8	20
Nursing Education	5	12.5
Nursing Management	4	10
Trauma Nursing	1	2.5
Paediatric Nursing	0	0

It must be noted that some respondents held more than one qualification.

As can be seen from **Table 4.6**, 22.5 percent (n=9) of the respondents had a qualification in Community Health Nursing and 20 percent (n=8) had a qualification in Psychiatric Nursing. This is due to the fact that according to **Table 4.4** more than 35 percent (n=14) of the participants had no more than 5 years experience since qualification which meant that they had qualified from 1989 onwards. Since 1989 all registered nurses who qualified in Namibia completed the comprehensive course which leads to registration as a general, psychiatric and community health nurse and midwife.

Item 8

In this item qualifications not appearing in Item 7 were to be mentioned if applicable. It appears that Item 7 made provision for all the possible qualifications as no new qualifications were mentioned.

4.2.7.2 Degree qualification of participants

Item 9

When studying **Table 4.7**, it should be noted that the person with the Magister degree in Nursing also had an Honours, as well as a (basic) generic degree in nursing. In total, only 7.5 percent (n=3) had degrees in Nursing.

Table 4.7 DEGREE QUALIFICATIONS BY THE PARTICIPANTS
(N=40)

DEGREE	NUMBER	PERCENTAGE
B.Cur. (Basic Generic Degree)	2	5
Any post-registration B.-degree in Nursing	1	2.5
Honours Nursing degree	2	5
Magister in Nursing	1	2.5

4.2.8 Place of employment

Item 10

Table 4.8 shows that 60 percent (n=24) of the participants were employed by state hospitals which is the largest employer in Namibia.

Table 4.8 PLACE OF EMPLOYMENT OF PARTICIPANTS
(N=40)

EMPLOYER	NUMBER	PERCENTAGE
State	24	60
Private	16	40
TOTAL	40	100.0

4.3 RESULTS OF THE PRE-TESTS AND THE POST-TEST OF THE PARTICIPANTS

Two of the objectives that are mentioned in Chapter 1, Section 1.4 are:

- * To develop learning packages for nurses to develop the necessary skills and knowledge to meet these standards
- * To test the effectiveness of such learning packages for utilization in distance teaching

The development of the learning packages have been described in Chapter 3.

To test the effectiveness of these learning packages, it was necessary to randomly assign the participants into experimental and control groups.

This process is discussed in Chapter 3, Section 3.3.1.

This meant that the experimental groups received the learning packages and the control groups did not.

An instrument, in this case an objective multiple choice questionnaire (Chapter 3, Section 3.2.3.2) was developed.

See also Annexure C.

This instrument tested the following hypothesis:

Alternative hypothesis:

- * Registered nurses who have studied the learning packages will have a higher score in their post-test than in their pre-test (H_{i1}).
- * Registered nurses who have studied the learning packages will have higher post-test scores than registered nurses who have not studied the learning packages (H_{i2}).

Null hypothesis:

- * There will be no difference in the scores obtained between the pre-tests and the post-tests of the registered nurses who have studied the learning packages (H_{01}).
- * There will be no difference in the final post-test scores between the registered nurses who have studied the learning packages and registered nurses who have not studied the learning packages (H_{02}).

The results of the pre-tests and post-tests are shown in Table 4.9, Table 4.10, Table 4.11 and Table 4.12.

**Table 4.9 TEST RESULTS OF GROUP A
FIRST EXPERIMENTAL GROUP
(N=19)**

PARTICIPANT CODE	PRE-TEST	POST-TEST
1	41	50
2	50	59
3	45	59
4	35	63
5	41	55
6	50	59
7	47	67
8	41	57
9	42	62
10	47	67
11	46	60
14	37	55
55	41	70
56	48	64
57	18	51
58	40	52
59	40	43
13 (0)	42	60
15 (0)	36	66

**Table 4.10 TEST RESULTS OF GROUP C
SECOND EXPERIMENTAL GROUP
POST-TEST ONLY
(N=6)**

PARTICIPANT CODE	PRE-TEST	POST-TEST
49	-	61
50	-	49
10 (0)	-	51
12 (0)	-	67
14 (0)	-	82
19 (0)	-	73

0 above indicates that these members belong to Oshakati.

**Table 4.11 TEST RESULTS OF GROUP B
FIRST CONTROL GROUP
(N=9)**

PARTICIPANT CODE	PRE-TEST	POST-TEST
18	42	44
19	41	37
20	40	38
21	32	35
23	34	34
24	37	34
61	31	33
62	53	50
73	26	22

**Table 4.12 TEST RESULTS OF GROUP D
SECOND CONTROL GROUP
POST-TEST ONLY
(N=11)**

PARTICIPANT CODE	PRE-TEST	POST-TEST
60	-	34
63	-	50
64	-	45
65	-	34
66	-	32
69	-	34
70	-	32
71	-	30
22 (0)	-	38
23 (0)	-	47
24 (0)	-	39

0 above indicates that these numbers belong to Oshakati.

4.3.1 Considerations for statistical analysis

4.3.1.1 Parametric versus non-parametric statistical methods

According to Brink (1987:118) parametric statistical methods are applied to data when certain assumptions about the parameters of the population are being complied with.

They are:

- * The data comes from normally distributed populations
- * The data must be independent from one another
- * The populations have the same or known variances
- * Measurement of the variables is by means of an interval or ratio measurement scale
- * The samples are randomly selected

Non-parametric statistical tests require few of the restrictive assumptions concerning the shape of the distribution of critical variables. Due to this, non-parametric statistical tests are sometimes called distribution-free statistics.

As the researcher implemented the principles of the experimental design, and due to the relatively small sample, both methods were used and the same results were obtained.

* **Parametric test**

The matched pairs t procedure was utilized.

* **Non-parametric test**

Two tests were utilized here:

- Paired t test
- The two-way ANOVA (Analysis of variance) (Polit and Hungler, 1983:525)

4.3.1.2 Testing of hypothesis: Parametric

H₀: There will be no difference in the scores obtained between the pre-tests and the post-tests of the registered nurses who have studied the learning packages.

$$\left[\begin{array}{l} \mu_{pre} = \mu_{post} \\ \text{OR} \\ H_0 : \mu = 0 \\ \text{where } \mu = \mu_{pre} - \mu_{post} \end{array} \right]$$

H₁: Registered nurses who have studied the learning packages will have a significantly higher score in their post-test than in their pre-test.

$$\left[\begin{array}{l} \mu_{pre} < \mu_{post} \\ \text{OR} \\ H_1 : \mu < 0 \\ \text{where } \mu = \mu_{pre} - \mu_{post} \end{array} \right]$$

(a) Experimental group (Group A)

- * The differences form a single sample

$$\bar{x} = 16,74$$

$$s = 8,41$$

- * $t = \frac{x - 0}{s/\sqrt{n}} = 8,68$

- * $\therefore 8,68 > 3,922$ at $p = 0,0005$

- * *Reject H₀*

- * The differences are not equal to zero

- * The improvement in scores is very unlikely to be due to chance alone

H₀: There will be no difference in the scores obtained between the pre-tests and the post-tests of the registered nurses who have studied the learning packages.

$$\left[\begin{array}{l} \mu_{pre} = \mu_{post} \\ \text{OR} \\ H_0 : \mu = 0 \\ \text{where } \mu = \mu_{pre} - \mu_{post} \end{array} \right]$$

H₁: Registered nurses who have studied the learning packages will have a significantly higher score in their post-test than in their pre-test.

$$\left[\begin{array}{l} \mu_{pre} < \mu_{post} \\ \text{OR} \\ H_1 : \mu < 0 \\ \text{where } \mu = \mu_{pre} - \mu_{post} \end{array} \right]$$

(b) **Control group (Group B)**

* $H_0 : \mu = 0$

* $H_1 : \mu \neq 0$

* $t = \frac{\bar{x} - \mu}{s/\sqrt{n}}$

$\bar{x} = -1$

$s = 2,78$

$$= \frac{-1-0}{2,78/\sqrt{9}}$$

$$= -1,079$$

* $(t) = 1,079 < t_3^{0,05} = 1,86$

* \therefore Accept H_0

* The difference between the pre- and post-test scores are equal to zero at the 5 % level ($1,079 < 1,86 = t_3^{0,05}$).

4.3.1.3 Testing of hypothesis: non-parametric

H_0 : There will be no difference in the scores obtained between the pre-tests and the post-tests of the registered nurses who have studied the learning packages.

$$[H_0 : M_D = 0]$$

$$[D = \text{Post-}/\text{Pre-test score}]$$

H_1 : Registered nurses who have studied the learning packages will have a higher score in their post-test than in their pre-test.

$$[H_1 : M_D > 0]$$

$$[D = \text{post-}/\text{Pre-test score}]$$

- (a) Experimental group (Group A)
(Paired T)

$$* \quad \bar{D} = \frac{318}{19} = 16,74$$

$$* \quad s_d^2 = \frac{n \sum d_i^2 - (\sum d_i)^2}{n(n-1)}$$

$$= 53,64$$

$$* \quad s_d = 7,32$$

- * Test statistic:

$$\frac{\bar{D} - 0}{s_d / \sqrt{n}}$$

$$= \frac{16,74 - 0}{7,32 / \sqrt{19}}$$

$$= 9,97$$

- * $9,97 > 3,922$
- * Thus, reject H_0 .
- * The differences are significantly greater than zero.
- * Thus, there is a difference between the pre-test and the post-test at the 0,05 % level (test statistic $> 3,922$ for $p + 0,0005$).

(b) Control group (Group B)

$$H_0 : M_D = 0$$

$$H_1 : M_D > 0$$

$$* \quad \bar{D} = 9/9 = 1$$

$$* \quad s_d^2 = \frac{n \sum d_i^2 - (\sum d_i)^2}{n(n-1)}$$

$$= 7,75$$

$$* \quad s_d = 2,78$$

* Test statistic:

$$\frac{\bar{D} - 0}{s_d / \sqrt{n}}$$

$$= \frac{1 - 0}{2,78/\sqrt{9}}$$

$$= 1,079$$

* $1,07 < 1,86$

* Thus, accept H_0 .

* Thus, there is no difference between the pre- and post-test scores for the control group at the 5 % level of significance ($test\ statistic < t_8^{0,05} = 1,86$).

H_0 : There will be no difference in the final post-test scores between the registered nurses who have studied the learning packages and the registered nurses who have not studied the learning packages.

$$[H_0 : \mu_A + \mu_C = \mu_B + \mu_D]$$

H_1 : Registered nurses who have studied the learning packages will have higher post-test scores than registered nurses who have not proceeded through the learning packages.

$$[H_1 : \mu_A + \mu_C > \mu_B + \mu_D]$$

(c) Two (2) experimental groups (A and C) and two (2) control groups (B and D)

* Two-way ANOVA (Analysis of variance)

$$* [H_0 : \mu_A + \mu_C = \mu_B + \mu_D]$$

$$[H_1 : \mu_A + \mu_C > \mu_B + \mu_D]$$

$$* \lambda_1 = 1; \lambda_2 = 1; \lambda_3 = -1; \lambda_4 = -1.$$

$$\therefore \mu_A + \mu_C - \mu_B - \mu_D > 0$$

	<i>i</i> =1	<i>i</i> =2	<i>i</i> =3	<i>i</i> =4	
* GROUP	A	B	C	D	SUM
Rank sums (<i>R_i</i>)	606	97,5	211	120,5	1035
Sample size (<i>n_i</i>)	19	6	9	11	(45=N)
Mean ranks	31,89	10,83	35,17	10,93	

$$* L = \sum \lambda_i R_i$$

$$= 1 \times 606 + 1 \times 211 - 1 \times 97,5 - 1 \times 120,5$$

$$= 599$$

$$* E = (n + 1) \sum n_i \lambda_i^2 / 2 = 113$$

$$V = (n+1)(n \sum n_i \lambda_i^2 - (\sum n_i \lambda_i)^2) / 1$$

$$= 7660,67$$

$$Z = (L - E) / \sqrt{V}$$

$$= 5,53$$

* 5,53 is significant at $p = 0,00002$

\therefore reject H_0 , the specified order of mean ranks is significant.

4.3.2 Conclusion on testing of the hypotheses

As can be seen from Sections 4.3.1.2 and 4.3.1.3, the null hypotheses (H_0) are rejected and the alternative hypotheses (H_1) accepted.

The alternative hypotheses which are accepted are:

- * *Registered nurses who have studied the learning packages will have a higher score in their post-test than in their pre-test.*
- * *Registered nurses who have studied the learning packages will have higher post-test scores than registered nurses who have not studied the learning packages.*

It can thus be concluded that in this research project the learning packages did contribute to an increase in knowledge on selected aspects of critical care nursing, which in this project were identified as life-threatening situations.

4.3.3 Analysis of the test results with regard to the individual packages

The pre- and post-tests consisted of a hundred (100) questions and the distribution of the questions between the different learning packages are indicated in **Table 4.13**.

Table 4.13 DISTRIBUTION OF QUESTIONS OF THE PRE- AND POST-TESTS BETWEEN THE DIFFERENT LEARNING PACKAGES

LEARNING PACKAGES	PERCENTAGE OF QUESTIONS ASKED ON EACH PACKAGE	NUMBER OF QUESTIONS ASKED ON EACH PACKAGE
1. Basic Life Support	10	10
2. Advanced Cardiac Life Support	11	11
3. Shock	9	9
4. Burns	8	8
5. Chest Trauma	8	8
6. Head Injuries	10	10
7. Spinal Cord Injuries	10	10
8. Seizures	5	5
9. Diabetic Ketoacidosis	9	9
10. Recovery Room Nursing	10	10
11. Legal and Ethical Issues	10	10
TOTAL	100 %	100 (N)

Each package was analysed individually to identify possible problem areas.

4.3.3.1 Analysis of results on learning package no 1: Basic Life Support

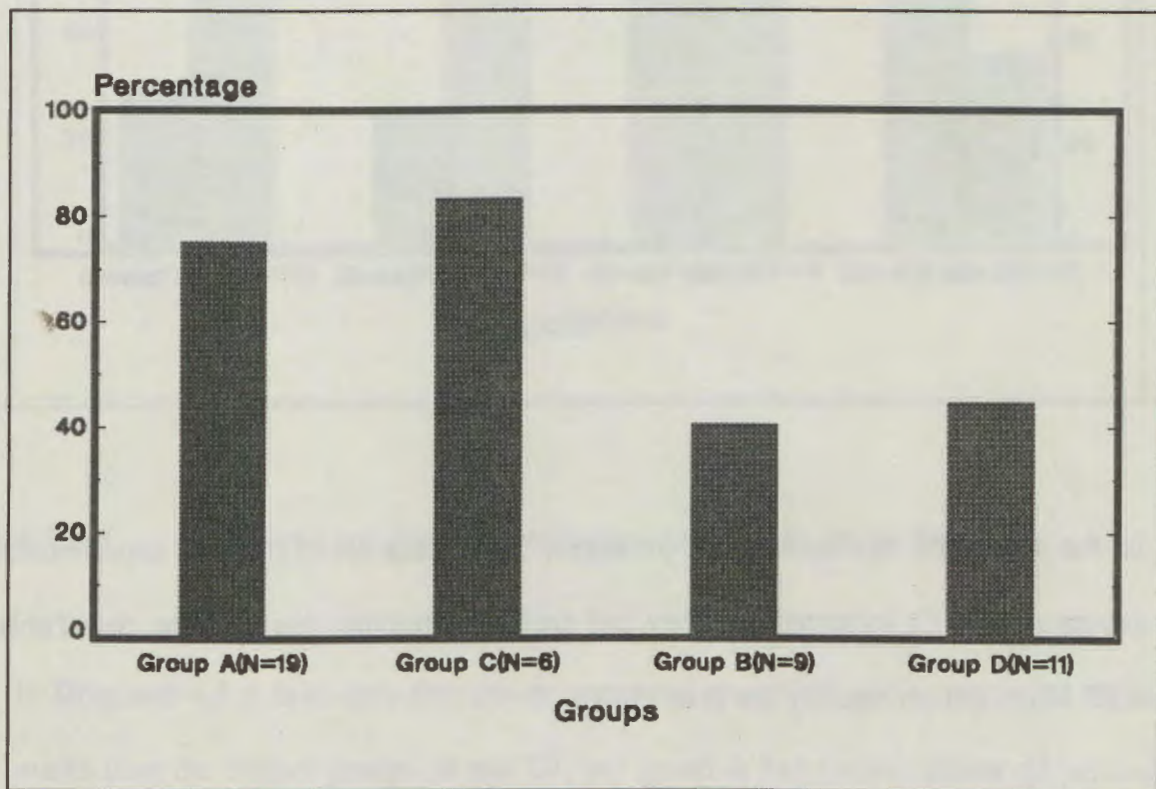
Diagram 4.1 shows that the two experimental groups' (A & C) means were above 60 percent.

It correlates with their own comments on the post-test in **Table 4.17**, where 90 percent (N=18) of these two groups, A & C, indicated that they did not experience any problems with this particular learning package.

specific package. Only 20 of the 25 participants completed the learning package evaluation form.

It was not specifically indicated by the participants what the problem(s) was(were).

Diagram 4.2 BAR GRAPH REPRESENTING THE RESULTS OF LEARNING PACKAGE NO 2: ADVANCED CARDIAC LIFE SUPPORT



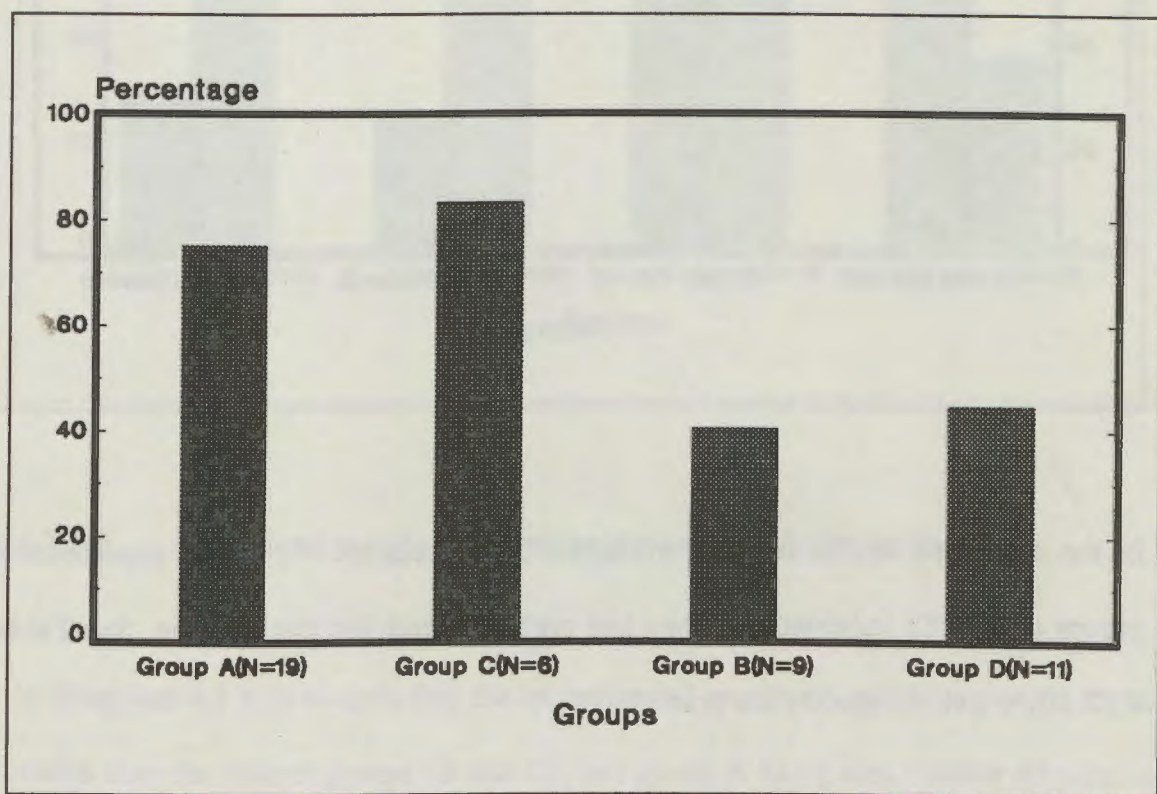
4.3.3.3 Analysis of results on learning package no 3: Shock

Although the experimental groups A and C achieved higher marks than the control groups (B and D) the means of the experimental groups were below 60 percent, as can be seen in **Diagram 4.3**.

specific package. Only 20 of the 25 participants completed the learning package evaluation form.

It was not specifically indicated by the participants what the problem(s) was(were).

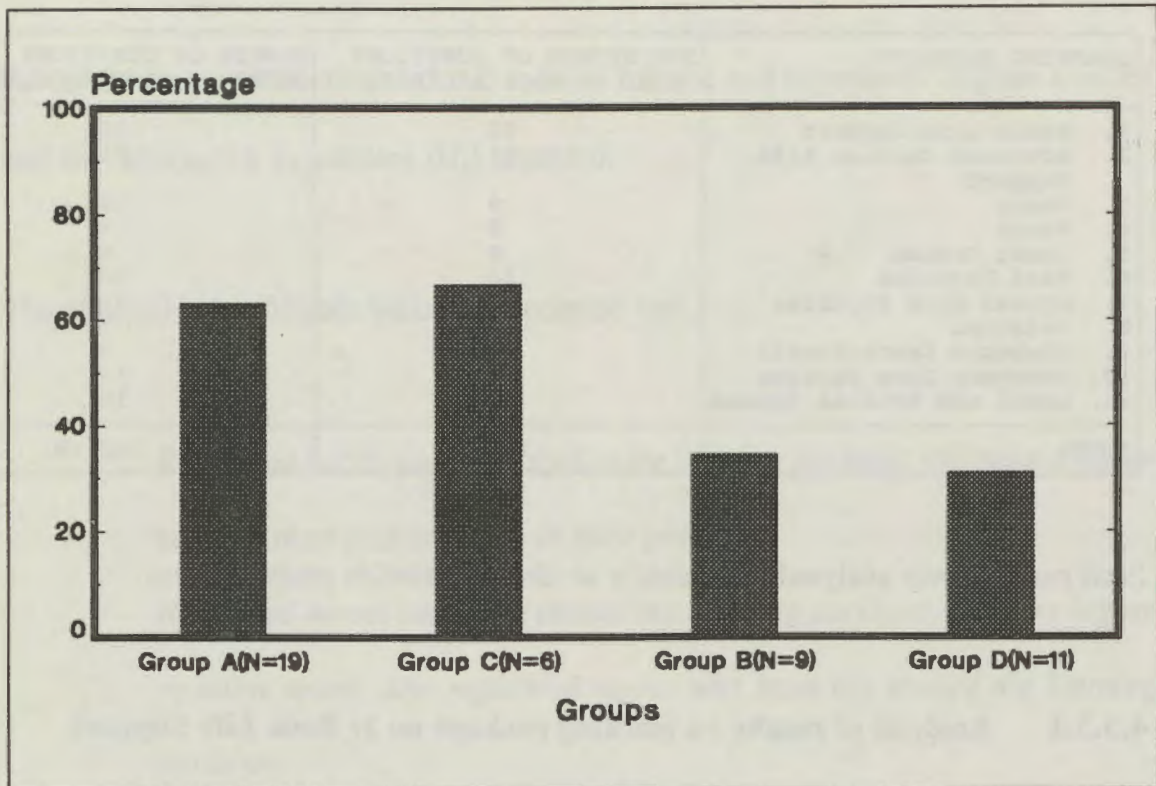
Diagram 4.2 BAR GRAPH REPRESENTING THE RESULTS OF LEARNING PACKAGE NO 2: ADVANCED CARDIAC LIFE SUPPORT



4.3.3.3 Analysis of results on learning package no 3: Shock

Although the experimental groups A and C achieved higher marks than the control groups (B and D) the means of the experimental groups were below 60 percent, as can be seen in **Diagram 4.3**.

Diagram 4.1 BAR GRAPH REPRESENTING THE RESULTS OF LEARNING PACKAGE NO 1: BASIC LIFE SUPPORT



4.3.3.2 Analysis of results on learning package no 2: Advanced Cardiac Life Support

In **Diagram 4.2** it can be seen that groups A and C, the experimental groups' means were above 75 percent.

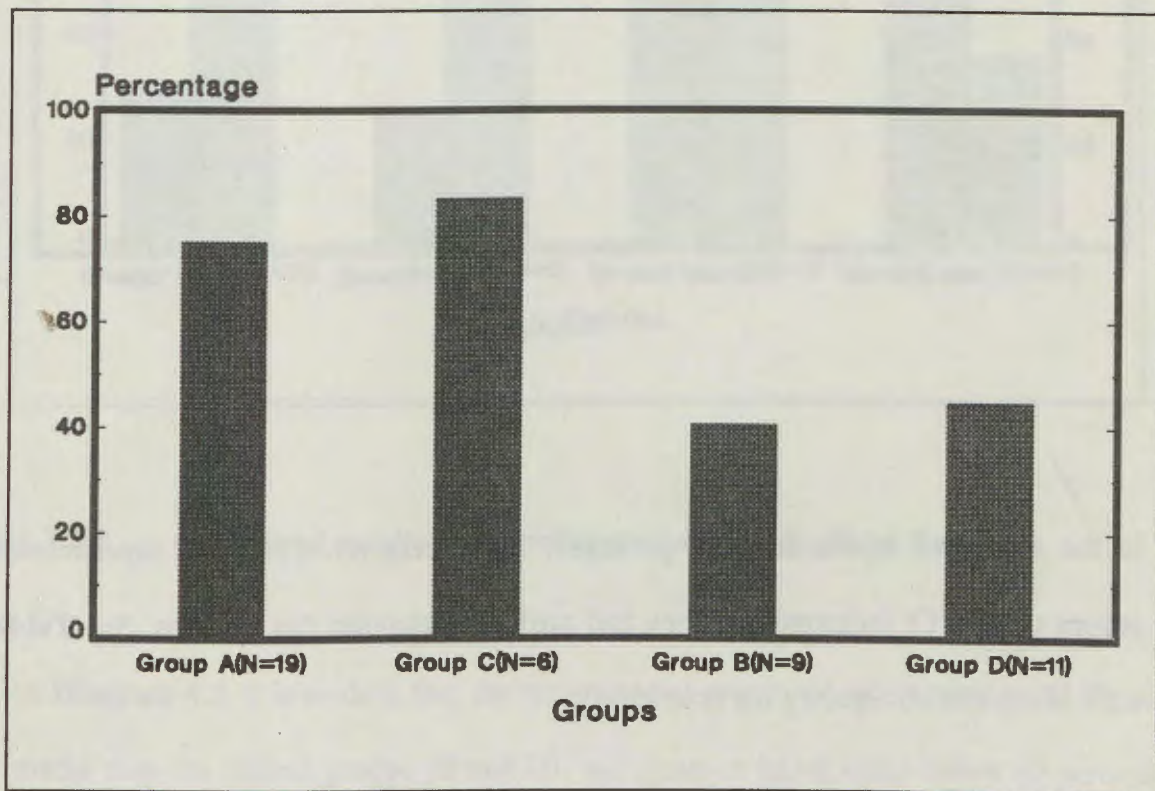
The researcher had lectured on this specific learning package as it involved complex arrhythmia recognition which had to be simulated on a monitor. The high means of groups A and C may be partly attributed to this aspect.

Still, despite the high achievements by the two experimental groups (A and C), 35 percent (N=7) had indicated in **Table 4.17** that they did experience problems with this

specific package. Only 20 of the 25 participants completed the learning package evaluation form.

It was not specifically indicated by the participants what the problem(s) was(were).

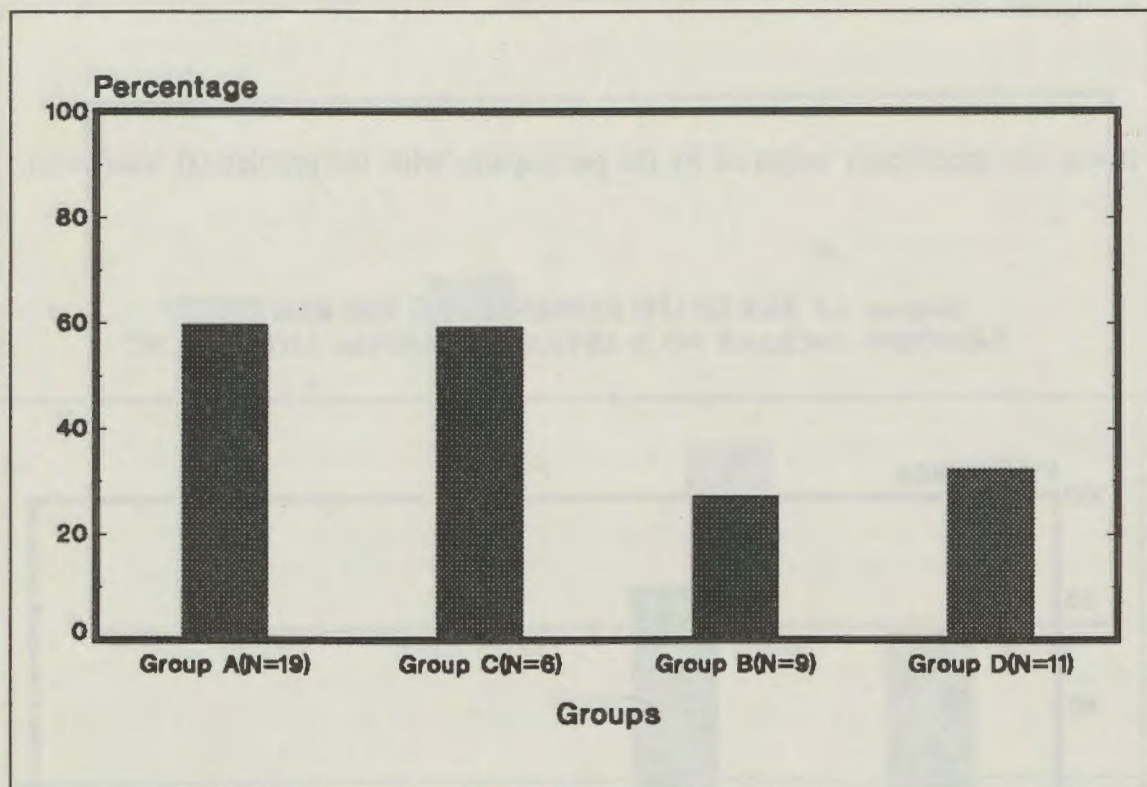
Diagram 4.2 BAR GRAPH REPRESENTING THE RESULTS OF LEARNING PACKAGE NO 2: ADVANCED CARDIAC LIFE SUPPORT



4.3.3.3 Analysis of results on learning package no 3: Shock

Although the experimental groups A and C achieved higher marks than the control groups (B and D) the means of the experimental groups were below 60 percent, as can be seen in **Diagram 4.3**.

Diagram 4.3 BAR GRAPH REPRESENTING THE RESULTS OF LEARNING PACKAGE NO 3: SHOCK

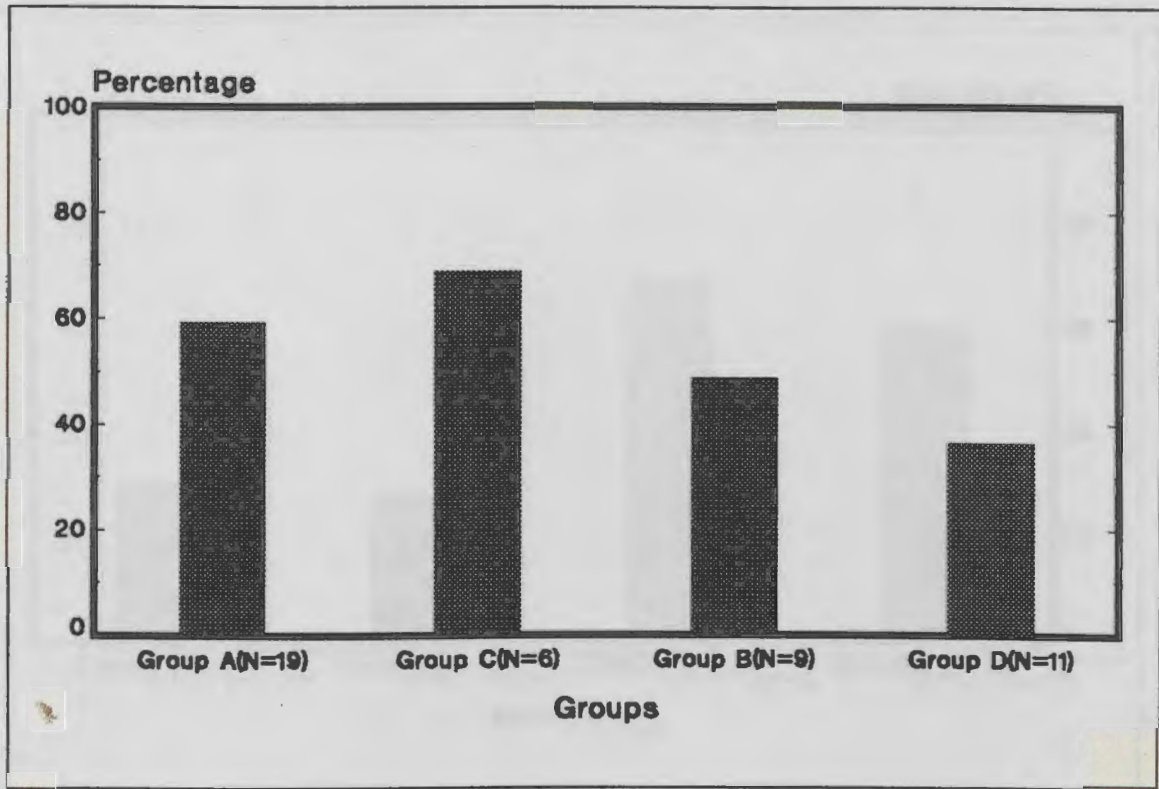


In the evaluation of the learning packages, 35 percent ($N=7$) of the experimental groups (A and C) indicated that they had problems studying this package. See Table 4.17. They did not specify the problem(s).

4.3.3.4 Analysis of results on learning package no 4: Burns

As can be seen in Diagram 4.4, only one of the experimental groups, C, had a mean above 60 percent. However, in their evaluation of the learning packages only 10 percent ($N=2$) of the experimental groups indicated that they experienced problems with this specific learning package. See also Table 4.17.

Diagram 4.4 BAR GRAPH REPRESENTING THE RESULTS OF LEARNING PACKAGE NO 4: BURNS



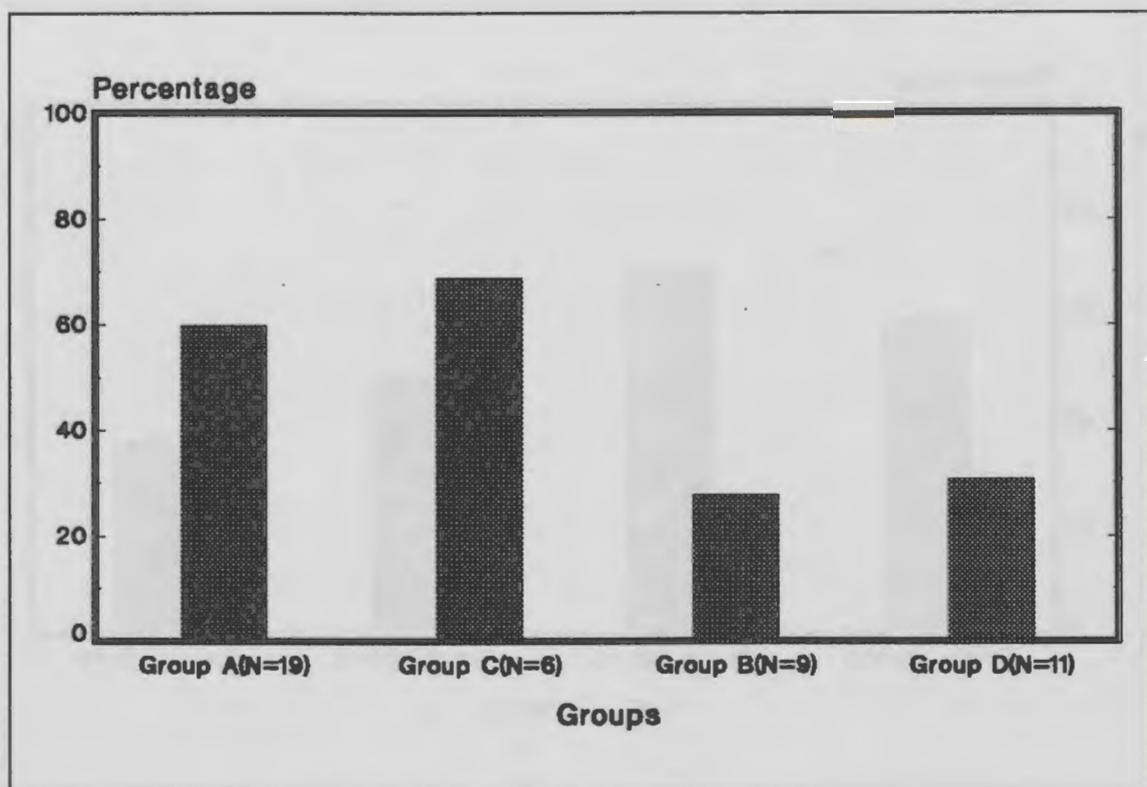
4.3.3.5 Analysis of results on learning package no 5: Chest Trauma

In **Diagram 4.5** it is evident that the experimental groups (A and C) achieved higher marks than the control groups (B and D), but group A had a mean below 60 percent.

Again 35 percent (N=7) of the experimental groups (A and C) indicated that they experienced problems with this package, but the problem(s) was(were) not specified.

See **Table 4.17**.

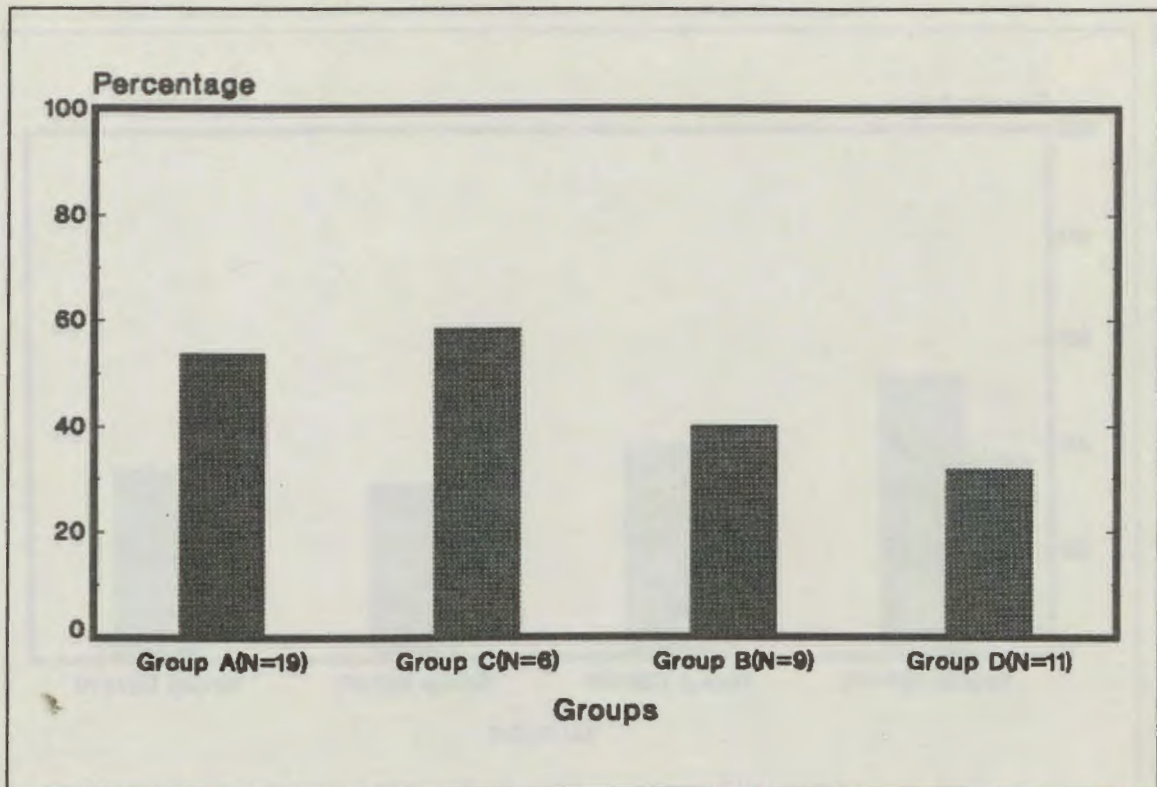
Diagram 4.5 BAR GRAPH REPRESENTING THE RESULTS OF LEARNING PACKAGE NO 5: CHEST TRAUMA



4.3.3.6 Analysis of results on learning package no 6: The Immediate and Short-term Treatment of Head Injuries

Diagram 4.6 shows the means of the four groups. Thirty five percent (N=7) of the experimental groups (A and C) indicated that they experienced problems with this package. See Table 4.17. The type of problem(s) was(were) not specified.

Diagram 4.6 BAR GRAPH REPRESENTING THE RESULTS OF LEARNING PACKAGE NO 6: THE IMMEDIATE AND SHORT-TERM TREATMENT OF HEAD INJURIES

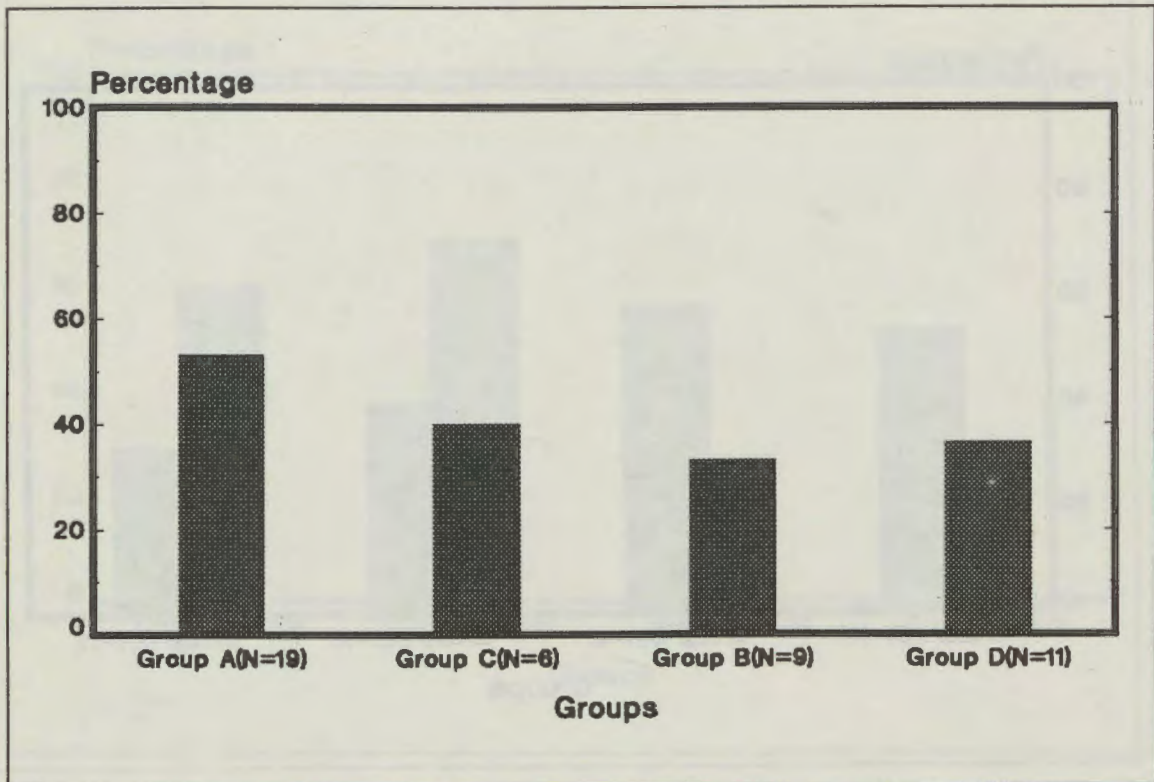


4.3.3.7 Analysis of results on learning package no 7: The Immediate and Short-term Treatment of Spinal Cord Injuries

From **Diagram 4.7** it can be seen that the experimental groups (A and C) did not do extremely well, particularly group C.

It correlates with **Table 4.17** where 65 percent (N=13) of the experimental groups (A and C) indicated that they experienced problems with this learning package. They did not specify the problem(s) experienced.

Diagram 4.7 BAR GRAPH REPRESENTING THE RESULTS OF LEARNING PACKAGE NO 7: THE IMMEDIATE AND SHORT-TERM TREATMENT OF SPINAL CORD INJURIES

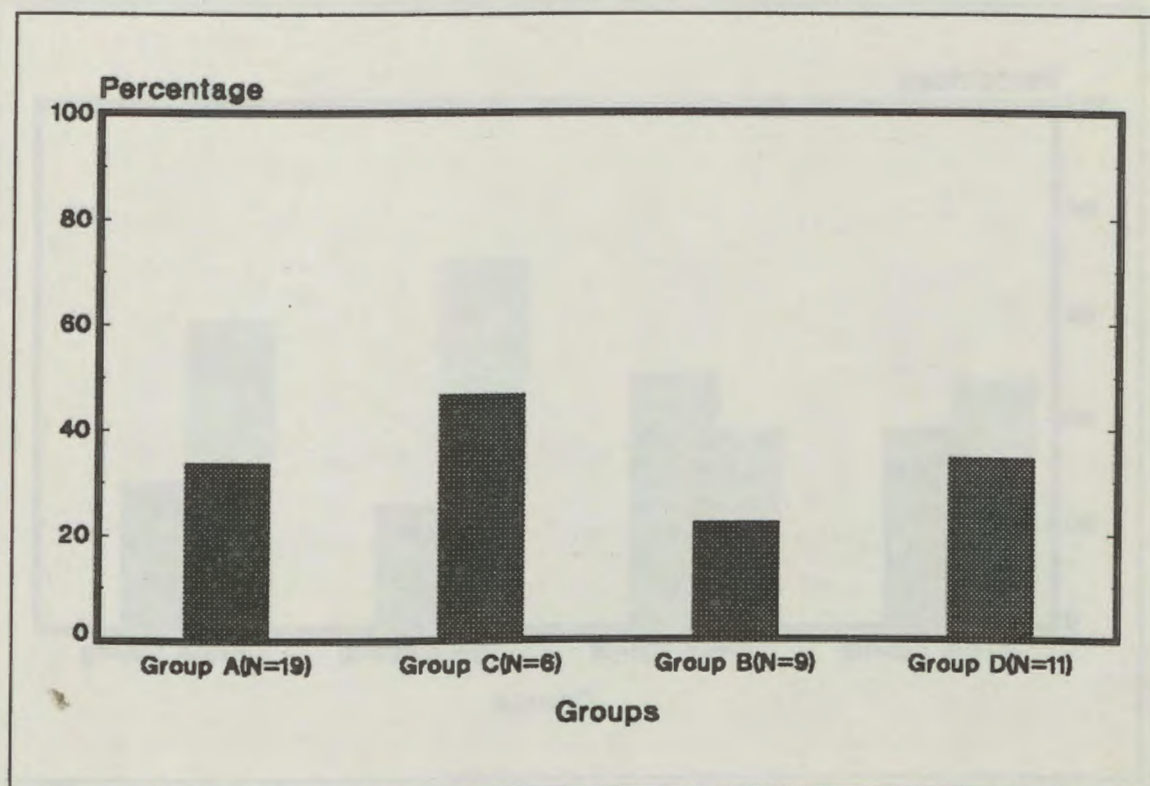


4.3.3.8 Analysis of results on learning package no 8: Seizures

Diagram 4.8 indicates that the experimental groups (A and C) did not compare well with the control groups (B and D).

Sixty percent (N=12) of the experimental groups (A and C) indicated that they experienced problems with this package. See **Table 4.17**. The problems are discussed in **Table 4.18**.

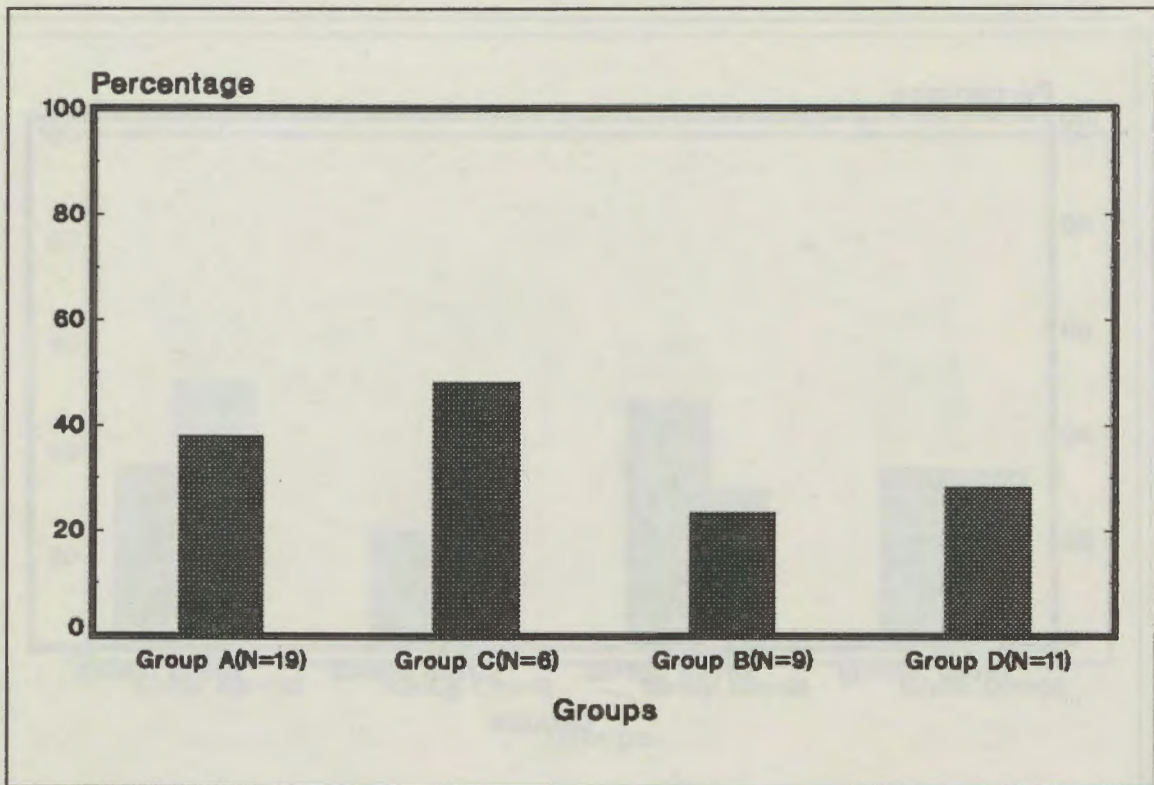
Diagram 4.8 BAR GRAPH REPRESENTING THE RESULTS OF LEARNING PACKAGE NO 8: SEIZURES



4.3.3.9 Analysis of results on learning package no 9: Diabetic Ketoacidosis

As **Diagram 4.9** shows this learning package seemed to be difficult. However, only 25 percent (N=5) of the experimental group (A and C) indicated that they experienced problems with this package. They did not indicate what the nature of the problem(s) were. See **Table 4.17**.

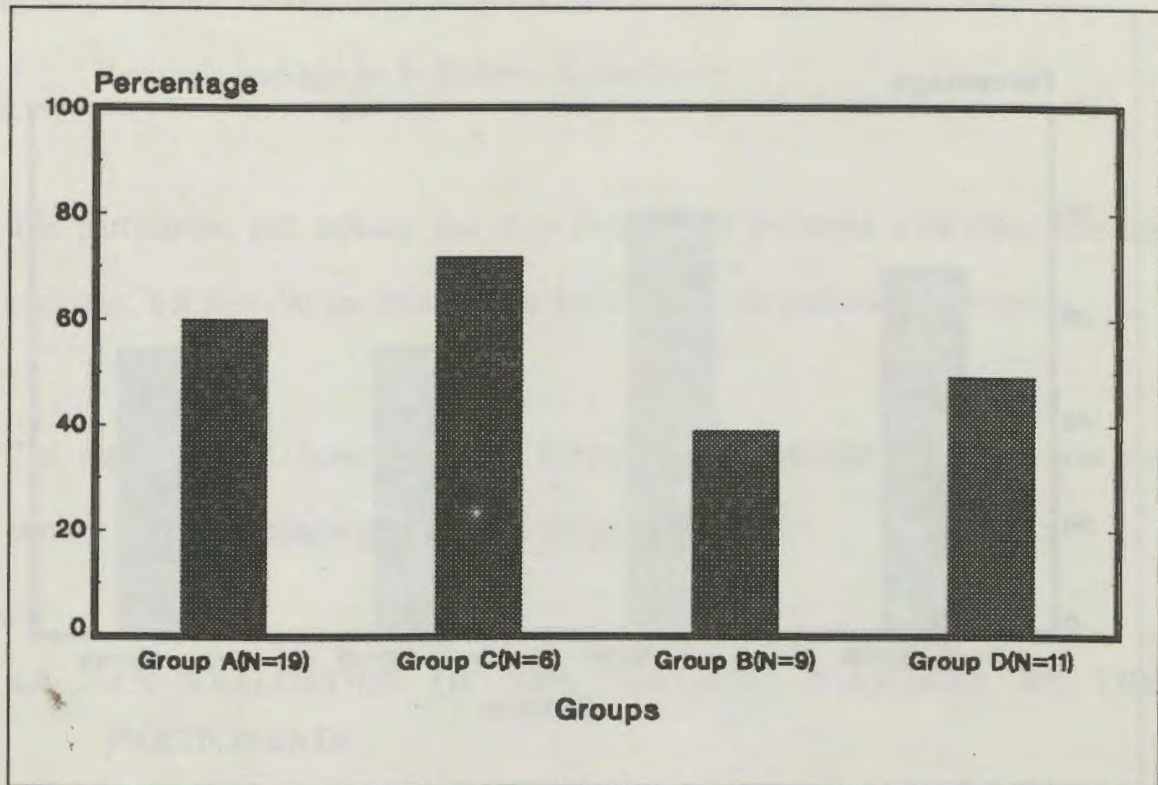
Diagram 4.9 BAR GRAPH REPRESENTING THE RESULTS OF LEARNING PACKAGE NO 9: DIABETIC KETOACIDOSIS



4.3.3.10 Analysis of results on learning package no 10: Recovery Room Nursing.

Diagram 4.10 shows that both experimental groups (A and C) had means of 60 percent and higher. Twenty five percent (N=5) indicated in **Table 4.17** that they did experience problems with this package.

Diagram 4.10 BAR GRAPH REPRESENTING THE RESULTS OF LEARNING PACKAGE NO 10: RECOVERY ROOM NURSING

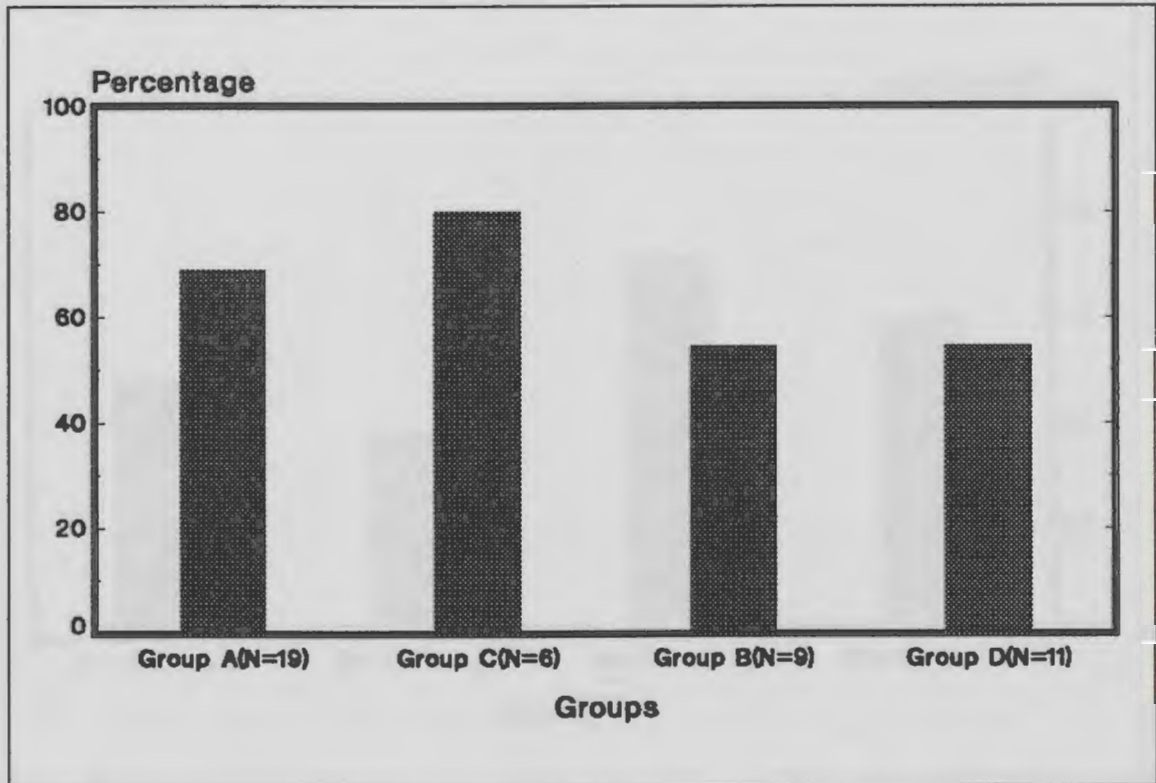


4.3.3.11 Analysis of results on learning package no 11: Selected Legal and Ethical Issues

Diagram 4.11 shows that all four groups had means above 50 percent.

Twenty percent (N=4) of the experimental group indicated that they experienced problems with this package. They did not specify the nature of their problem(s).

Diagram 4.11 BAR GRAPH REPRESENTING THE RESULTS OF LEARNING PACKAGE NO 11: SELECTED LEGAL AND ETHICAL ISSUES



4.3.4 Summary comments on the results of the individual learning packages

The results of each of the eleven (11) learning packages were individually analysed and also compared with the participants' comments on the respective learning packages (the participants' comments on the respective learning packages are discussed in more detail in Section 4.4).

In some of the learning packages one or both of the experimental groups did not obtain an average of 50 percent. These packages were:

- * Learning package no 7: The Immediate and Short-term Treatment of Spinal

Cord Injuries;

- * Learning Package no 8: Seizures; and
- * Learning package no 9: Diabetic Ketoacidosis.

The participants did indicate that they experienced problems with these learning packages, but they did not elaborate on the nature of the problems experienced.

The researcher did, however, obtain information by informal discussions that the content of these packages proved to be difficult to master.

4.4 AN EVALUATION OF THE LEARNING PACKAGES BY THE PARTICIPANTS

An important aspect of the research project was to have the research learning packages evaluated by the participants in order to refine them accordingly.

An instrument, "Course (Learning Package) Evaluation Form" (Annexure D), was used.

Only the two experimental groups, A and C, received this instrument (Annexure D). They were exposed to the experimental treatment and as such received the learning packages.

A total of 55 percent (N=25) of the participants who completed the experiment, were exposed to the experimental treatment. The findings from this particular instrument,

Annexure D, which consisted of eleven (11) items, is discussed in this section.

There were eleven (11) items in this instrument.

4.4.1 Coding

Item 1

Space was provided in this item for the participants to indicate their code. The numbers ranged from 1 to 75.

4.4.2 Comparison of the two (2) experimental groups

Item 2

From **Table 4.14** it can be seen that only twenty (20) of the twenty five (25) participants in the two (2) experimental groups returned this instrument.

**Table 4.14 COMPARISON OF THE TWO (2) EXPERIMENTAL GROUPS
(N=25)**

GROUP	NUMBER (N)	PERCENTAGE (%)
A	14	56
C	6	24
No reply	5	20
TOTAL	25	100

4.4.3 Evaluation of the objectives of the learning packages by the two (2) experimental groups

Item 3

Table 4.15 shows that the mean score for "sufficiency" of the objectives was below 3.50.

However, no suggestions for improvement or comments with regard to the objectives were made.

Table 4.15 MEAN EVALUATION SCORES AND PERCENTAGES OF PARTICIPANTS ON THE OBJECTIVES OF THE LEARNING PACKAGES (N=20)

QUESTION	PERCENTAGE						MEAN	
	5	4	3	2	1	Mis-sing		
							3.75	
The objectives of the eleven packages were:								
1. Helpful	40	40	10	5	0	5	Not helpful	4.00
2. Understandable	30	45	20		5	0	Not understandable	3.93
3. Sufficient	30	25	20	10	10	5	Insufficient	3.40
4. Appropriate	25	45	10	15	0	5	Inappropriate	3.65

4.4.4 Evaluation of the learning activities of the learning packages by the two (2) experimental groups

Item 4

Table 4.16 shows that 65 percent of the participants of the two (2) experimental groups, A and C, indicated that additional reading material was not available.

There was possibly a misunderstanding with regard to the reading material. To each hospital where participants were employed, one set of reading material was sent. The idea was that the participants should circulate and share between them.

Table 4.16 EVALUATION OF THE LEARNING ACTIVITIES OF THE LEARNING PACKAGES BY THE TWO (2) EXPERIMENTAL GROUPS (N=20)

ACTIVITY	POSITIVE (YES) REPLY		NEGATIVE (NO) REPLY		NOT APPLICABLE	
	NUMBER (N)	PERCENTAGE (%)	NUMBER	PERCENTAGE (%)	NUMBER	PERCENTAGE (%)
1. Were the reading lists sufficient	12	60	8	40	-	-
2. Were additional readings available	7	35	13	65	-	-
3. Were coordinators available	13	65	5	25	2	10

A subdivision of Item 4 consisted of an open-ended question where the participants had to state any comments on the learning activities.

Seven (7) participants commented:

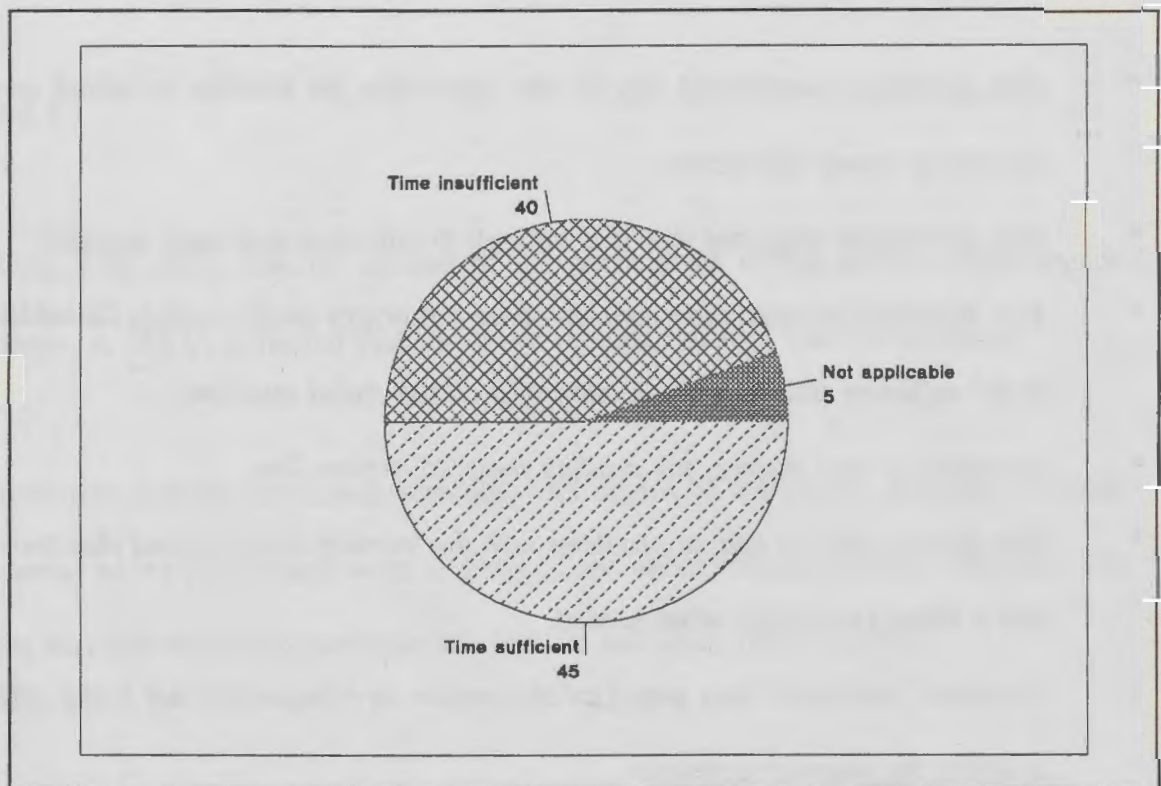
- * *One participant mentioned that it was impossible for him/her to attend any lectures or group discussions.*
- * *One participant indicated that it is difficult to adhere to self-study methods.*
- * *Two participants stated their concern about a shortage on the reading list which is not sufficient (this is a duplication of a closed-ended question).*
- * *According to one student, the reading material arrived late.*
- * *One student said she had no problems with the learning activities and that there was a library available when needed.*
- * *The daily "workload" was stated by one person as a reason for not being able to utilize the learning activities.*

4.4.5 Comments on the allocated time-span

Item 5

As can be seen in **Diagram 4.12** 40 percent (N=8) of the participants felt that the time-span was insufficient.

**Diagram 4.12 SUFFICIENCY OF ALLOCATED TIME-SPAN
(N=20)**



As has been discussed in Section 3.8.1, the time-span of ten (10) weeks was decided upon after consultation with the peer review panel and comparison with the amount of work dealt with in an established single course subject in the Department of Nursing at the University of Namibia. This time-span may have been too short due to the fact that the experimental groups were in an employment situation with many responsibilities, whereas the student at the university may be full-time, or the course might spread over a longer time if the student is a part-time student.

4.4.6 Learning packages in which problems were experienced

Item 6

The eleven packages varied in difficulty and in this item they were to indicate which packages presented problems.

Table 4.17 shows the learning packages which presented problems:

- * Learning package no 7: The Immediate and Short-term Treatment of Spinal Cord Injuries
- * Learning package no 8: Seizures
- * Learning package no 9: Diabetic Ketoacidosis

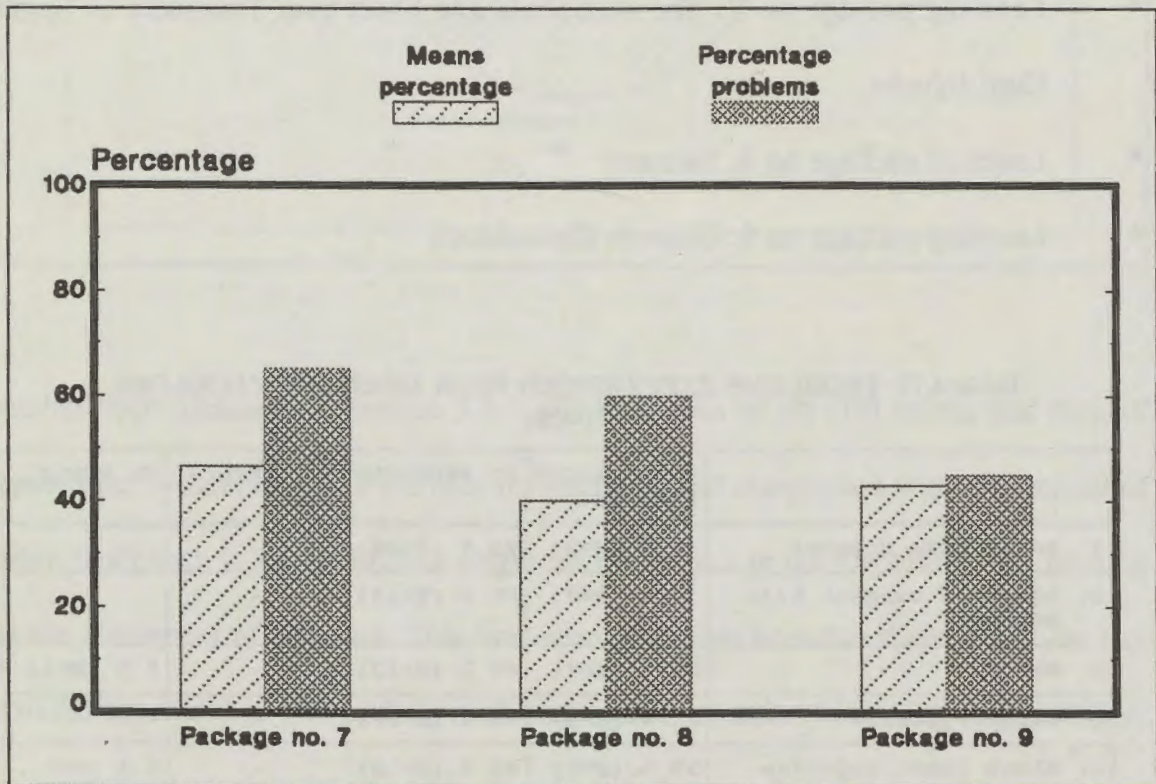
**Table 4.17 PROBLEMS EXPERIENCED WITH LEARNING PACKAGES
(N=20)**

	EXPERIENCED PROBLEMS	NO PROBLEMS	NOT APPLI-CABLE	NO REPLY
1. Basic Life Support	10 % (N=2)	90 % (N=18)	-	-
2. Advanced Cardial Life Support	35 % (N=7)	65 % (N=13)	-	-
3. Shock	35 % (N=7)	60 % (N=12)	-	5 % (N=1)
4. Burn Injuries	10 % (N=2)	90 % (N=18)	-	-
5. Blunt Chest Injuries	35 % (N=7)	60 % (N=12)	-	5 % (N=1)
6. Immediate and short term treatment of head injuries	35 % (N=7)	65 % (N=13)	-	-
7. Spinal Cord Injuries	65 % (N=13)	35 % (N=7)	-	-
8. Seizures	60 % (N=12)	40 % (N=8)	-	-
9. Diabetic Ketoacidosis	25 % (N=5)	5 % (N=1)	-	70% (N=14)
10. Recovery room nursing	25 % (N=5)	75 % (N=15)	-	-
11. Selected legal and ethical aspects	20 % (N=4)	75 % (N=15)	-	5 % (N=1)

This corresponds with the participants achievements in these specific learning packages as discussed in Sections 4.3.3.7, 4.3.3.8 and 4.3.3.9.

In **Diagram 4.13** the mean results of the experimental groups (A and C) on these packages are compared with their acknowledgement of problems experienced in these packages.

Diagram 4.13 COMPARISON OF THE MEANS OF RESULTS OF CERTAIN LEARNING PACKAGES AND THE PROBLEMS EXPERIENCED WITH THESE PACKAGES



LEGEND:
 Learning package no 7: The Immediate and Short-term Treatment of Spinal Cord Injuries
 Learning package no 8: Seizures
 Learning package no 9: Diabetic Ketoacidosis

A subdivision of Item 6 provided the opportunity for the participants of the

experimental groups, A and C, to comment on the nature of the problems they experienced.

This subdivision was an open-ended question.

Nine (9) comments were made and are as follows in Table 4.15.

Table 4.18 COMMENTS WITH REGARD TO PROBLEMS EXPERIENCED WITH THE LEARNING PACKAGES

COMMENTS	NUMBER OF PARTICIPANTS WITH THE SAME COMMENT
The participant did not study	1
There was a lack of textbooks	4
The participant did not understand the learning packages	1
The allotted time was too short	2
There were no coordinators to provide help and support	1

4.4.7 Justification of selected topics in the learning packages by participants of the experimental groups

Item 7

As is shown in Table 4.19, the participants felt that there is an overwhelming need for all the topics which were included in the learning packages.

**Table 4.19 THE NEED FOR THE SELECTED TOPICS IN THE LEARNING PACKAGES
(N=20)**

	THERE IS A NEED (1)	NO NEED (2)	NOT APPLI- CABLE	NO REPLY
1. Basic Life Support	80 % (N=16)	15 % (N=3)	-	5 % (N=1)
2. Advanced Cardial Life Support	85 % (N=17)	10 % (N=2)	-	5 % (N=1)
3. Shock	80 % (N=16)	10 % (N=2)	-	10 % (N=2)
4. Burn Injuries	80 % (N=16)	15 % (N=3)	-	5 % (N=1)
5. Blunt Chest Injuries	80 % (N=16)	15 % (N=3)	-	5 % (N=1)
6. Immediate and Short Term Treatment of head injuries	85 % (N=17)	10 % (N=2)	-	5 % (N=1)
7. Spinal Cord Injuries	85 % (N=17)	10 % (N=2)	-	5 % (N=1)
8. Seizures	80 % (N=16)	15 % (N=3)	-	5 % (N=1)
9. Diabetic Ketoacidosis	80 % (N=16)	15 % (N=3)	-	5 % (N=1)
10. Recovery Room Nursing	80 % (N=16)	15 % (N=3)	-	5 % (N=1)
11. Selected Legal and Ethical Aspects	90 % (N=18)	5 % (N=1)	-	5 % (N=1)

4.4.8 Self-rating by the experimental groups on their knowledge level improvement

Item 8

Table 4.20 shows that 20 percent of the experimental groups perceived themselves as being closer to "no improvement in knowledge", than to "drastic improvement in knowledge", while 35 percent showed major or "drastic" improvement, and 45 percent adopted a neutral stance.

**Table 4.20 KNOWLEDGE LEVEL AFTER COMPLETION OF THE LEARNING PACKAGES
(N=20)**

QUESTION	A = RATING B = PERCENTAGE							MEAN
	A) 5	4	3	2	1	Mis- sing		
Drastical improve- ment	B)10	25	45	15	5	-	No impro- vement	3.20

4.4.9 Self-rating by the experimental groups on their psychomotor improvement

Item 9

As can be seen in Table 4.21, 45 percent of the experimental groups have placed themselves closer to "drastic improvement" in psychomotor improvement, while 25 percent indicated no improvement and 30 percent are neutral.

This is, however, a subjective rating, but it shows that these participants perceive themselves positively with regard to their skills.

**Table 4.21 MEAN SELF-EVALUATION SCORES AND PERCENTAGES OF PARTICIPANTS ON THEIR PSYCHOMOTOR LEVEL AFTER COMPLETION OF THE LEARNING PACKAGES
(N=20)**

QUESTION	A = RATING B = PERCENTAGE							MEAN
	A) 5	4	3	2	1			
Drastical improve- ment	B)10	35	30	15	10	-	No impro- vement	3.20

4.4.10 Self-rating by the experimental groups on improvement of their confidence level

Item 10

Table 4.22 shows that 40 percent (the majority) of the experimental group, rate themselves in the middle, while 30 percent believe they have undergone drastic improvement and 25 percent rate themselves closer to the "no improvement" option.

Table 4.22 MEAN SELF-EVALUATION SCORES AND PERCENTAGES OF PARTICIPANTS ON THEIR CONFIDENCE LEVEL AFTER COMPLETION OF THE LEARNING PACKAGES (N=20)

QUESTION	A = RATING B = PERCENTAGE						MEAN
	A) 5	4	3	2	1	Missing	
Drastical improvement	B) 5	25	40	10	15	5	No improvement 3.20

4.4.11 The experimental groups' comments on the post-test

Item 11

All the participants had to complete the post-test, but only the experimental groups were asked to comment on the test. Their comments are presented in Table 4.23.

**Table 4.23 THE COMMENTS OF THE EXPERIMENTAL GROUPS
WITH REGARD TO THE POST-TEST
(N=20)**

	YES	NO	NOT APPLI- CABLE	NO REPLY
1. The questions were fair?	95 % (N=19)	5 % (N=1)		
2. The questions relate to the objectives?	90 % (N=18)	5 % (N=1)	5 % (N=1)	
3. The questions were understandable?	75 % (N=15)	15 % (N=3)	5 % (N=1)	5 % (N=1)
4. The questions concentrated on important aspects?	100 % (N=20)			

It should be noted that 15 percent (N=3) indicated that the questions were not understandable.

4.4.12 Suggestions for improvements

Item 12

This item concluded this instrument (Annexure D), where the participants had to make suggestions for the improvement of the learning packages. It was an open-ended question.

The suggestions were:

- * The questions in the post-test needed restructuring as they were not all understandable: indicated by one (1) participant.
- * The participants needed to arrange group discussions between themselves:

suggested by one (1) participant.

- * The literature that was supplied by the researcher needed to be expanded on: suggested by one (1) participant.
- * The duration of study for such a course needs to be longer: suggested by two (2) participants.
- * The medium of instruction (English) was a problem. Instruction in Afrikaans would be more advantageous: suggested by one (1) participant.
- * Qualified intensive care personnel in the different hospitals should be involved in giving support and guidance: suggested by one (1) participant.

Positive comments were made by two (2) participants who indicated that they enjoyed this experiment and would like similar short courses.

4.5 ANALYSIS OF THE FINAL EVALUATION OF THE PARTICIPANTS

This information was obtained by means of the instrument:

Product Evaluation (Annexure E)

This instrument was to be completed by five (5) registered nurses, of which three had a qualification in critical (intensive) care nursing, one was a nurse experienced in emergency room care and one was a nursing supervisor in rural hospital.

In **Table 4.24** an outline is provided of these five (5) evaluators, and the number of

participants to be evaluated by them.

Table 4.24 A COMPARISON OF THE PRODUCT EVALUATORS AND THE NUMBER OF PARTICIPANTS TO BE EVALUATED

EVALUATORS	HOSPITAL	NUMBER OF PARTICIPANTS TO BE EVALUATED	COMPLETED EVALUATION FORMS RECEIVED (ANNEXURE E)
1	Medicity Private Hospital	12	1
1	Oshakati State Hospital	6	1
1	Windhoek Complex: Katutura (a)	2	1
1	Windhoek Complex: Katutura (b)	3	1
1	Otjiwarongo State Hospital	2	0
TOTAL	Four Hospitals	25	4

As one (1) evaluator did not return the form, only four (4) hospitals undertook the product evaluation.

The instrument consisted of seven (7) items, and the responses to them are described next.

4.5.1 Applicability of the learning packages

Item 1

Table 4.25 shows that 75 percent (N=3) of the evaluators indicated that the packages were applicable, while one (1) evaluator indicated a mark of four (4) out of a possible high of five (5).

**Table 4.25 APPLICABILITY OF THE LEARNING PACKAGE
AS JUDGED BY THE EVALUATORS
(N=4)**

QUESTION	A = RATING PERCENTAGES B = PERCENTAGE						MEAN
	A) 5	4	3	2	1	Missing	
Applicable	B) 75	25	-	-	-	-	Not applicable 4.75

4.5.2 The need for independent learning material for registered nurses

Item 2

All the evaluators, 100 percent (N=4) indicated that there is a need for independent learning material for registered nurses.

4.5.3 Justification of selected topics in the learning packages by the product evaluators

Item 3

All the product evaluators, 100 percent (N=4), agreed that there is a need for all the topics dealt with in the learning packages.

One (1) evaluator, 25 percent (N=1), said, however, that there is no need for a specific topic, namely "Recovery Room Nursing", which is being dealt with in learning package no 10.

This agreement on the need of the topics correlates with the findings of the participants

in the experimental groups (see Table 4.19).

4.5.4 Knowledge level of the experimental groups after completion of the learning packages as rated by the product evaluators

Item 4

Table 4.26 shows that the product evaluators obtained a mean of 3.75 with regard to the participants knowledge level. Their mean is higher than the mean obtained through self-evaluation by the participants (Table 4.20).

The researcher is aware that the product evaluators arrived at their score by means of subjective, or not strictly controlled objective methods.

Table 4.26 KNOWLEDGE LEVEL AFTER COMPLETION OF THE LEARNING PACKAGES AS INDICATED BY THE PRODUCT EVALUATORS

QUESTION	A = RATING B = PERCENTAGE							MEAN
	A) 5	4	3	2	1	Missing		
Noticeable improvement	B) -	75	25	-	-	-	No improvement	3.75

Item 4 also made provision for comments on the participants knowledge level. The comments were as follows:

- * *They show more improvement because they can diagnose patients with chest trauma, shocked patients, etc.*
- * *They can identify dysrhythmias.*

- * *There is a marked improvement in the knowledge of some participants.*

One evaluator who had two (2) candidates to evaluate commented as follows:

- * *... did not notice theoretical improvement. These candidates showed good initiative, even before the experiment.*

However, it is knowledge not initiative that constitutes the problem. Without a clear definition of what is meant by initiative the comment does not really reflect the situation.

4.5.5 Psychomotor improvement of the experimental groups as rated by the product evaluators

Item 5

As can be seen in **Table 4.27** the mean score is 3.75.

This score must be put into perspective. One evaluator who had only two (2) candidates to evaluate, allocated a "5" for psychomotor performance. One evaluator, who had six (6) candidates to evaluate, allocated a "4" for psychomotor performance. This means that seventeen (17) candidates were collectively awarded only a "3".

**Table 4.27 PSYCHOMOTOR IMPROVEMENT BY THE EXPERIMENTAL GROUPS
AS RATED BY THE PRODUCT EVALUATORS
(N=4)**

QUESTION	A = RATING B = PERCENTAGE						MEAN
	A) 5	4	3	2	1	Missing	
Noticeable improvement	B)25	25	50	-	-	3.75	No improvement 3.75

Item 5 made provision for the evaluators to comment on the participants psychomotor performance.

The comments were as follows:

- * *The participants psychomotor performances did improve, but this may be due to an increase in their confidence level.*
- * *No marked improvement.*
- * *This aspect needs more attention.*

4.5.6 The confidence level of the experimental groups as rated by the product evaluators

Item 6

The product evaluators indicated that the participants demonstrated an increase in their confidence level. As is shown in **Table 4.28**, a high mean of 4.0 was obtained. The one (1) evaluator who recorded a three (3) had only two (2) participants to evaluate.

**Table 4.28 CONFIDENCE LEVEL OF THE EXPERIMENTAL GROUP
AS RATED BY THE PRODUCT EVALUATORS
(N=4)**

QUESTION	A = RATING B = PERCENTAGE						MEAN
	A) 5	4	3	2	1	Missing	
Noticeable improvement	B) 25	50	25	-	-	-	No improvement 4.0

The opportunity to comment on the participants confidence level, was provided for in Item 6.

The comments were as follows:

- * *The students show much confidence in their tasks.*
- * *There is a marked improvement in their confidence in dealing with emergency situations.*
- * *They can perform cardio-pulmonary resuscitation independently.*

4.5.7 Suggestions for improvements of the learning packages by the product evaluators (N=4)

Item 7

This was an open ended question and the suggestions were as follows:

- * *The learning packages are sufficient.*
- * *The packages must be available as annual courses for registered nurses.*
- * *I think the present packages are very good.*

One evaluator suggested a structural change:

- * *Learning package no 2 (Advanced Cardiac Life Support) should be divided into two (2) parts.*
- * *The psychomotor aspects should receive more attention.*

4.5.8 Conclusion

From this research project, support for the feasibility of distance education was obtained from statistical analysis, as well as the evaluation comments of the participants and product evaluators. In addition certain factors emerged which need remedial action or further investigation to ensure quality nursing. These latter findings can be regarded as a valuable spinoff from the experimental research.

By means of statistical analysis, parametrical and non-parametrical, the hypotheses were accepted that the learning packages did enhance the experimental group's knowledge on selected aspects of critical care nursing.

The learning packages were evaluated by the two (2) experimental groups and the product evaluators.

From their contributions it was evident that:

- * There is a need for self-study learning packages in nursing.
- * The topics included in the learning packages are relevant.
- * The learning packages did improve their knowledge level and confidence level with regard to these selected aspects of critical care nursing.
- * Their psychomotor performance could, however, still be improved.
- * No really structural changes had to be made in the learning packages, but:
 - The study period should be lengthened.
 - More reading material should be available.
 - Where possible, competent registered nurses should be available to support and help them.

The overall comments were positive and that these learning packages are essential and necessary.

CHAPTER 5

SUMMARY OF FINDINGS, CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

In this chapter the research objectives are being evaluated to see if they have been met by summarising the most significant findings and conclusions of this study. Limitations which were identified during the study are discussed. Recommendations for further research, course developments and motivation and support for possible future students are made.

5.2 AIM AND METHOD OF THE STUDY

The aim of this research project is reflected in the title:

The development of nursing care standards by means of peer group consensus for selected critical and high care situations in hospitals in Namibia and the implementation thereof by means of self-study learning packages. An experimental study.

The necessity for this research project was in part identified in a previous project by the researcher (Small, 1988:143-165).

In order to achieve this aim a Delphi Technique was undertaken where the peer group had to select ten (10) topics/themes which they regarded as essential to know in order to intervene in life-threatening or potentially life-threatening situations.

After identification of these topics/themes they were incorporated into ten learning packages. An additional learning package was compiled on *Selected Legal and Ethical Issues* by the researcher.

These eleven packages were submitted to the peer group for testing and validation after which volunteer registered nurses were requested to study these learning packages over a ten week period after which period they were tested. They were also requested to evaluate these packages. This was done by means of an evaluation questionnaire to evaluate the suitability of the packages under a system of distance education.

For the testing of the packages an experimental design, the Solomon Four Group Design, was utilized.

For the experiment two research hypotheses (H_{i1} and H_{i2}) were formulated, as well as two Null (statistical) hypotheses (H_{o1} and H_{o2}) (see Section 1.6, 3.2.3.2 (a) and 4.3):

Both parametrical and non-parametrical tests were done to test these hypotheses.

A final product evaluation was done by appointed persons to evaluate the participants in the clinical setting.

5.3 FINDINGS AND CONCLUSIONS OF THE RESEARCH PROJECT

The findings and conclusions of the experiment are summarised according to the aim and objectives of the research project which were formulated in the introductory chapter.

5.3.1 The critical and life-threatening situations for which standards have to be designed by the peer group

The peer group selected the first ten (10) topics/themes and the researcher added the eleventh (see Section 3.2.1). This selection was done by means of two rounds of the Delphi Technique.

This selection was cross-referenced in the literature and the researcher concluded that the crucial topics or themes have been selected (Table 2.7).

5.3.2 The learning needs of registered nurses who are providing care in life-threatening situations

The need to enhance the registered nurse's knowledge on selected aspects of critical care nursing had been established in 1988 by Small (1988:156). In this survey it had been found that basic critical care nursing knowledge was lacking. In a test on selected

aspects of critical care nursing, the mean was 36 percent.

This lack of knowledge had some serious implications. It meant that:

- * The critically ill patient is not receiving the care he or she needs. There is a contractual relationship between the patient and the hospital authority once the patient is admitted to the hospital.
- * The critically ill patient is receiving incorrect treatment, which has major medico-legal implications.
- * The registered nurse is liable to be held accountable for lack of "due care" by:
 - the patient;
 - the employer; and
 - the registering authority.
- * The patient might need to be hospitalized for longer periods due to delayed or incorrect care. This has financial implications.

These findings have prompted the researcher to recommend in 1988 that in-service education to rectify the situation is urgently needed.

5.3.3 The development of learning packages for nurses to develop the necessary skills and knowledge on selected aspects of critical care nursing

The eleven learning packages were developed by the researcher and submitted to the peer review panel.

This part is discussed in Section 3.2.3.

5.3.4 Testing of the learning packages

5.3.4.1 The experimental phase

Sixty-three (63) registered nurses volunteered to participate in the experiment. Forty-five (71 %) completed the project of whom twenty-five (55,5 %) were allocated to the experimental groups who received and studied the learning packages.

These participants all completed a post-experimental test, depending to which group of the Solomon Four Group Design they belonged. Group A had a pre-experimental test mean of 41.1 percent and a post-experimental mean of 58.8 percent. Although there was an improvement, the post-experimental mean is still below what can be regarded as safe nursing practice in conditions which require a high degree of accuracy by the nurse.

The post-experimental results, however, led to the **rejection** of the Null hypotheses (see Section 4.3.1.2 and 4.3.1.3).

The conclusion from the acceptance of the alternative hypotheses is that the learning packages may enhance knowledge and skills of critical nursing and so enhance nursing care standards.

This conclusion addresses the crux of the research project's aim.

5.3.4.2 Analysis of the test results of the individual learning packages

The testing of the hypotheses was based on the test results of the eleven learning packages.

Some learning packages seemed to be more difficult than others, a uniform level of difficulty was apparently not maintained, though this could perhaps relate to the knowledge level of the nurses about various clinical conditions and the pathophysiology there-of. Investigation and refinement of these packages is needed.

These learning packages were:

* *Learning package no 7:*

The Immediate and Short Term Treatment of Spinal Cord Injuries

* *Learning package no 8:*

Seizures

* *Learning package no 9:*

Diabetic Ketoacidosis

(see Section 4.3.3.7, 4.3.3.8 and 4.3.3.9).

5.3.5 An evaluation of the learning packages by the participants

Aim: To refine the learning packages in order to submit them for future utilization.

Aspects indicated by the participants, during this process, were as follows:

- * Reading material was not available (**Table 4.16**)
- * There was a lack of textbooks (**Table 4.18**)
- * The time-span was too short (**Table 4.18**)
- * Certain learning packages were difficult:
(see Section 4.4.6).
- * Less than 50 percent of the participants rated themselves as having become more skilled (psychomotor improvement), (**Table 4.2.1**)

This finding needs further investigation, as knowledge needs to be assimilated into skilled actions. It could also lead to a lack of behavioural changes in that lack of knowledge is reflected in lack of skilled action and confidence.

In screening the literature on continuing education, Francke, Garssen and Huijer Abu-Saad (1995:375) found that in programmes on physical assessment, the most frequently cited reason for lack of behavioural changes was that nurses did not feel competent enough with their skills.

In another study by Nolan, Owens and Nolan (1995:555 & 556) they have found that

nursing managers and nursing educators did not regard the development of clinical skills as an important component or advantage of continuing professional education.

5.4 LIMITATIONS IDENTIFIED DURING THE STUDY

During the course of the study certain limitations were identified. The most important being:

- * Relative small sample due to the fact that participants had to be volunteers. Few registered nurses were willing to volunteer for ten (10) weeks of study.

The results of the data analysis are therefore only based on the sample per se.

- * The "mortality" of participants

This links to the above-mentioned limitations in that the volunteers had to put in a lot of effort.

- * Communication problems

Although all participants involved in the experimental testing of the packages were briefed by the researcher, there was misunderstanding with regard to additional reading material. Many of the participants were under the impression that each and everyone would receive a reading bundle, instead of one bundle for a specific hospital.

In the final evaluation of the learning packages by the participants, they concentrated more on the problems they personally experienced and suggested very few ideas to improve the learning packages.

5.5 RECOMMENDATIONS ARISING FROM THE RESEARCH PROJECT

5.5.1 Recommendation no. 1

It is recommended that:

A system of distance education for all registered nurses involved in clinical care be instituted in order to upgrade their knowledge and skills.

Commentary

The proving of hypotheses H_{i_1} and H_{i_2} and the improvement in post-test scores indicated this is a feasible approach.

5.5.2 Recommendation no. 2

It is recommended that:

The health care authorities adopt a policy of more vigorous

continuing education for all registered nurses in order to improve vital clinical knowledge and skills and that this be implemented through a system of distance education (see Section 4.5.2).

Commentary

Continuing education is vital to stay abreast with the newest developments. This is recognised by nurse educators and nurse managers as is evident by Muller's statement (1992:18) that continuing education should be promoted and facilitated by the nurse administrator.

Quality care without continuing education is not possible. Dangerous levels of care develop from lack of knowledge (Searle and Pera, 1995:269).

Some registered nurses are willing to enrol in continuing education programmes and they appreciate the necessity for such programmes. The product evaluators (n=4) have indicated that there is a need for independent learning material for registered nurses (see Section 4.5.2).

After ten (10) weeks of study by nurses in a clinical health care situation, there was only a 17.4 percent mean improvement in the knowledge of the participants. Nevertheless, there was improvement due to the study by means of distance education.

5.5.3 Recommendation no. 3

It is recommended that:

The health authorities be advised to check the quality of care in respect of life threatening situations in the rural hospital.

Commentary

The phenomenon that the majority of registered nurses who were on clinical nursing duties on the specific day when coordinators made contact with them (see Table 3.5) did not volunteer for the experiment, can be regarded as serious when cognisance is taken of the low percentage attained by those in the pre-test who did volunteer. The matter needs further investigation for the reluctance to participate may have been due to such well known factors

as:

- * Lack of confidence in personal professional competence beyond the requirements of basic nursing; poor self image and fear of risk-taking.
- * No wish to make the effort which might require further efforts at a later stage.
- * Over dependency on other persons, particularly doctors.
- * Distrust of such an activity in the belief that poor performance might be used against

the individual.

- * Too heavy a workload which leaves the nurse exhausted at the end of the day with no inclination to take part in educational experiments or further learning activities.
- * Too many family responsibilities to take on a ten (10) week period of study, unless they are released for such study by the employer.

(Searle, 1975, 1995 & Venter, 1975).

The fact that only five (5) registered nurses from the rural areas were prepared to participate indicates that further investigation into the learning needs and quality of nursing care is essential due to the fact that the major problem in dealing with emergency life threatening situations lies in the rural areas and in the district hospitals where clinical care skills are lacking and when lives are lost as a result (Anon, 1995:1).

Certain factors which emerged from the data analysis indicate that remedial action must be undertaken as soon as possible. A series of recommendations are made in this connection.

5.5.4 Recommendation no. 4

In view of the fact that the performance of the participants' pre-test was an average of 41.1 percent and in the post-test 58.8 percent, despite the study of the learning packages,

remedial action must be regarded as urgent, as quality care is seriously

threatened in such a situation.

Commentary

It is a matter of grave concern that the pre-test results are so poor. It is a well established fact in continuing education for nurses that registered nurses who are prepared to participate in educational experiments or who are prepared to submit to ad hoc assessments of their knowledge and skills, and who are prepared to take opportunities to learn, are persons who wish to improve their performance. They also have a fair measure of confidence in their professional ability and they have a sense of commitment to their role and functions. They are prepared to make the sacrifices to improve their professional competence (Searle lecture notes, 1975, and statement, 1995, & Venter's statement on quality nursing, 1975).

5.5.5 Recommendation no. 5

It is recommended that:

It be brought to the attention of the Ministry of Health and Social Services as a matter of urgency that the performance of the persons in the experimental groups was below a 50 percent level in the post-test in such serious situations as:

- *The immediate and short-term treatment of spinal cord injuries;*
- *Seizures; and*

- *Diabetic Ketoacidosis (Section 4.3.4).*

Commentary

It is discouraging to find that the percentage obtained after ten (10) weeks of study by the experimental groups was below 50 percent in respect of:

- * The immediate and short-term treatment of spinal cord injuries (Learning Package no. 7)
- * Seizures (Learning Package no. 8)
- * Diabetic Ketoacidosis (Learning Package no. 9)

In the first situation (Learning Package no. 7) life long damage may be caused, leaving the patient permanently incapacitated.

In the other two packages (no's 8 and 9) the situations are immediately life threatening.

This shortcoming, on behalf of registered nurses, needs urgent remedial action, even before a distance education learning system is introduced.

5.5.6 Recommendation no. 6

It is recommended that:

If a programme for distance education as recommended is introduced, the following be regarded as essential for an effective support service:

- * A regional resource centre to meet the needs of the district hospitals in the area should be established. Such a centre should contain an adequate number of up to date textbooks, appropriate journals and at least one television set and a video machine as well as a audio tape recording machine.*
- * The appointment of a critical care mentor at regional level from among the critical care nurses in the regional hospital.*
- * The critical care nurses be equipped to give support and guidance to fellow colleagues.*
- * The identification of resource personnel at regional level to act as mentors to students. This is part of the health policy in Namibia; that regional personnel should assist in the development of human resources at district and other levels.*

- * *The provision of resource materials such as reading bundles at the local hospital.*

- * *The creation of discussion groups to ensure networks in the area.*

- * *In-service education programmes to orientate and motivate nurses to develop their skills in providing quality care. This could be done by means of distance education programmes. A philosophy of life-long learning could be inculcated in this way.*

- * *The assistance and guidance of nurses to develop, collect and file their own resource materials.*

- * *The establishment of a central task force, consisting of health care providers and educators all with the relevant clinical experience and skills. Also a methodology should be designed to identify all the vital clinical competencies, the relevant resources and limitations, to determine financial implications for each module. Such calculations should include the cost of sending a student for a short period to the regional centre to acquire technological skills not available at district or other hospitals, but which are important in emergency life saving situations.*

The establishment of regional task forces could act as the supervisors of the

project for the first few years of the implementation of the project.

5.5.7 Recommendation no. 7

It is recommended that:

Mechanisms be devised to minimise professional isolation in critical care issues.

Commentary

It is necessary to ensure that discussion groups, reading responsibilities assigned to different members, workshops, journals, refresher courses and regular visits from regional experts, both nursing and medical, become a requirement for effective development of quality critical care.

5.5.8 Recommendation no. 8

It is recommended that:

Cost effective use of critical care equipment in regional centres be practised by ensuring that replaced items be repaired and utilized at small hospitals for emergency use, and for training purposes.

Commentary

Every hospital and health centre should possess at least the apparatus which is considered essential in a well equipped ambulance for use by paramedical personnel, and that nursing personnel be taught the correct use of such life-saving equipment.

5.5.9 Recommendation no. 9

It is recommended that:

The learning packages used in this experiment with the addition of midwifery and neonatal emergencies, be refined and utilized as the first baseline material for use in the proposed distance education programme.

Updating in accordance with clinical and technological development according to the situational needs should be an ongoing feature of using this material.

Commentary

The groundwork has been laid in devising such packages. This should suffice for the initial introduction of a distance learning programme for clinical nursing.

5.5.10 Recommendation no. 10

It is recommended that:

Structures be developed to ensure cost effective logistic aspects for the proposed distance education programme.

Commentary

The above is self-explanatory.

5.5.11 Recommendation no. 11

It is recommended that:

The Ministry of Health and Social Services, the Faculty of Medical and Health Sciences, as well as the Nursing Board of Namibia, jointly consider the implications of introducing a continuing education programme in selected aspects of critical care nursing by means of distance education, which could be recognised towards future qualifications for the nurse.

Commentary

Such a programme should ensure certification by a competent authority, for example an

extra-mural certification by the Faculty of Medical and Health Sciences, and recognition by the Nursing Board of Namibia as well as accreditation by the Board for individually completed modules leading towards registration as a qualified critical care nurse.

A competent authority means a statutory recognised educational authority, for only such an authority and the Nursing Board of Namibia may issue certificates which have validity in nursing education. The Registration Board may, in accordance with the powers vested in it, recognise the qualification issued by the Ministry of Health and Social Services and validate this by issuing a certificate of registration.

Certification and accreditation for successfully completed modules is of the utmost importance.

If such a programme is offered as an extra-mural education activity of the Faculty of Medical and Health Sciences, or by an institute of this Faculty, the credibility of the qualification would be enhanced and could lead to credits within the university nursing education system.

This is not a new concept. In the United States of America it is possible to gain credits from some universities for non-university education or for experiential learning (Andrew, 1988:41 and 44). It is also to build up credits by means of a modular system towards a chosen field of study.

In the literature review, Section 2.2.3, it was noted that White and Burford (1989:25-30) explained the South Australian approach in this regard, where they had restructured their

critical care courses. This restructuring led to shorter courses, but with the option to follow them up with other related courses on a modular basis.

5.6 CONCLUSIONS

This research indicates that many aspects of continuing education for nurses, both in urban and rural areas could be done by means of distance education.

This assumption is made on the grounds that the life threatening situations which were dealt with in this project, could be satisfactory covered by such means.

One of the aspects which was not dealt with, was critical care in midwifery and the neo-natal situation. Maternal and child care is the foundation for the health of a nation. Urgent attention is necessary to ascertain how the quality of critical care aspects could be improved by means of distance education. This project which has just been completed should be regarded as the beginning of a series of such projects, for example:

- operating room nursing;
- unit management;
- medical-legal aspects;
- health education in the primary health care situation;
- etc.

It would be the duty of the task force to identify specific needs. Policy decisions, cooperation

between health and educational institutions, careful motivation of personnel and establishment of a suitable structure to implement the programme and ensure improvement in quality nursing care through a cost effective distance education approach.

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1000
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12 August 1994

1000

I am currently drafting a proposal for the Department of Health and Human Services regarding the construction of my studies. It is important that you provide me with the necessary information.

For my research project I am developing a series of packages to address the needs of the community. The packages are based on the principles of community development. To ensure the success of these packages, I require your assistance in the following areas:

ANNEXURE A

If you could provide the following information, it would be greatly appreciated. The Department of Health and Human Services will be able to assist you.

1. A list of the names of the individuals who are currently working on the project (and your best contact).

2. If you are willing to study these packages, please provide the necessary information on the following form to me.

3. If you should agree to participate, you will be asked to complete a series of forms. Some of the forms will be filled out and also be used to study the packages. Some of the forms will only be used for research - everyone will receive the forms and will receive a copy of the results of the study.

I hope that you will have the time and energy to help me with this project. Your assistance will be greatly appreciated.

Thank you for your time and assistance.

L.L. STALL

ANNEXURE A

L.F. Small
P O Box 8589
Bachbrecht
WINDHOEK

15 August 1994

Dear _____

I am currently reading for a post-graduate degree at the University of Namibia. As part of the requirement of my studies I am to conduct a research project.

For my research project I am developing learning packages in critical care nursing. These learning packages are based on independent learning principles. To test the effectiveness of these packages, I require registered nurses to study them for ten weeks, after which they will be tested.

To make it worth your while - the following has been agreed upon:

- If you pass the final test, a document of successful completion of a short course at the Department of Nursing will be provided.
- Possible listing of the course with the new Namibian Nursing Board (this phase has not yet been finalized).

If you are willing to study these packages in your own time, please return the attached agreement form to me.

If you should agree to participate, you will be divided into groups. Some of the groups will be tested and also be asked to study the packages. Some of the groups will only be tested. Anyhow - everyone who passes the test will receive a certified statement from our Faculty at the University.

I hope that you will have the time available to help me test these packages (eleven of them). You will also be asked to evaluate them in order for improvements to be incorporated.

Hope to hear from you soon.

L.F. SMALL

AGREEMENT FORM: TO PARTICIPATE IN AN
EXPERIMENTAL RESEARCH DESIGN OF

L.F. SMALL

I _____ am willing to participate in the testing of learning packages on critical care nursing. I understand that I can either receive the packages and be asked to study them and be tested, or that I would not receive a package but only be asked to be tested.

Either way, I understand that I am entitled to receive a certified statement from the Faculty of Medical and Health Sciences if I should pass the final test, whether I have studied the packages or not.

15.08.1994

PROVIDING SUPPORTIVE SERVICES TO
SELECTED PATIENTS IN CLINICAL CARE SETTINGS

TARGET GROUP: 1000-1500 patients
COMPILED BY: [Name]
DATE: [Date]
DURATION: [Duration]

INSTRUCTIONS

1.1. Indicate your role in the study.

1.2. Indicate in which group you belong by marking 'X' in the appropriate column.
Now

ANNEXURE C

Group A	Group B	Group C	Group D

Mark through the numbers and words in the appropriate column.

Answer, if applicable, in 100 words.

- 1. X
- 2. X
- 3. X

Also indicate in which column you belong by marking 'X' in the appropriate column.

Responsible Clinician

Programme Director

How long do you intend to stay in the study?

**POST EVALUATION: SHORT COURSE IN
SELECTED ASPECTS OF CRITICAL CARE NURSING**

TARGET GROUP: Registered (qualified) nurses
COMPILED BY: L.F. Small
DATE: March/April 1995
DURATION: 2 hours

INSTRUCTIONS

1.1 Indicate your code in the space below:

1.2 Indicate to which group you belong by putting an "X" in the relevant column below:

GROUP A (1)	GROUP B (2)	GROUP C (3)	GROUP D (4)

Read through the questions and answer on the **question paper**.

Answer, for example, as follows:

1. ✗ or 1. (b)
 2. ✗ or 2. (a)
 3. ✗ or 3. (c)

Also remember to complete the following forms after this test:

- Biographic data document
- Programme assessment document

Now turn to the questions and make your choices.

BEST OF LUCK!

1. Signs of cardio-pulmonary arrest are:

1. Absence of major pulses
2. Dilated, unresponsive pupils
3. Miotic unresponsive pupils
4. Shallow breathing

Your choice:

- (a) 1 + 2 + 4
- (b) 1 + 3 + 4
- (c) 1 + 2
- (d) 1 + 4

2. Airway maintenance.

Correct statement/s.

1. The "Jaw-thrust manoeuvre" should be done when a neck injury is suspected.
2. Dentures should be removed.
3. The neck lift method should be used.

Your choice:

- (a) 1
- (b) 1 + 2
- (c) 3
- (d) 2 + 3

3. The "circulation" phase of resuscitation.

1. The carotid pulse in adults should be palpated.
2. The radial pulse is also reliable to determine if circulation is present.
3. Take at least 2 seconds to feel for a pulse.
4. Apply considerable pressure when feeling for a pulse.
5. Feel for a pulse after the first 2 breaths have been given.

Your choice:

- (a) 1 + 2 + 3 + 4 + 5
- (b) 1 + 2 + 3 + 5
- (c) 1 + 5
- (d) 1 + 4 + 5

4. You and your partner are eating at a restaurant. Suddenly another customer collapses while clutching his throat.

Your immediate action is to:

- (a) Administer a precordial thumb
- (b) Start cardiopulmonary resuscitation immediately
- (c) Turn him on his side to prevent aspiration
- (d) Perform the Heimlich manoeuvre

5. Chest compressions.

Correct statements are:

1. If you are performing cardio-pulmonary resuscitation alone, compress the sternum 5 times before administering 2 full breaths.
2. Compress an adult sternum to a depth of 2 - 3,5 cm.
3. Compress at a rate of 80 - 100 min in adults.
4. The duration of the compression must be equal to the duration of relaxation.

Your choice:

- (a) 1 + 2 + 3 + 4
- (b) 1 + 2 + 4
- (c) 3 + 4
- (d) 1 + 3

6. Resuscitation in children.

Correct statements are:

1. A small child's trachea tends to be more stiff and harder than in an adult.
2. A child's trachea may be at risk of being bent closed if extension of the head is too vigorous.
3. Palpate the carotid pulse to determine circulation, but apply softer pressure than in adults.
4. Compress the sternum to a depth of 1,5 - 2,5 cm in infants.

Your choice:

- (a) 1 + 2
- (b) 2 + 4
- (c) 1 + 2 + 3
- (d) 1 + 2 + 3 + 4

7. Living Will.

Correct statements are:

1. No legislation with regard to a "Living will" exists in South Africa and Namibia.
2. People in South Africa and Namibia who wish to have a type of "Living Will", can register their wish with the South African Voluntary Euthanasia Society.
3. The only involvement of the nurse in a situation similar to a "Living Will", is to discontinue a Life-Support System after the doctor is satisfied that brain death has occurred.
4. Where a legal document exists for passive euthanasia, the nurse is, by law obliged to adhere to it.

Your choice:

- (a) 1 + 3 + 4
- (b) 1 + 2 + 3 + 4
- (c) 3 + 4
- (d) 1 + 2

8. Termination of cardio-pulmonary resuscitation.

Correct statement.

1. An issue that may arise is the possibility of organ donation.
2. The nurse may terminate the resuscitation if she diagnoses biological death.
3. The nurse terminates the resuscitation when the medical officer advises her to do so.

Your choice:

- (a) 1
- (b) 2
- (c) 1 + 2
- (d) 1 + 3

9. During cardio-pulmonary resuscitation, the rescuer's breath contains:

- (a) 10 % oxygen
- (b) 16 % oxygen
- (c) 50 % oxygen
- (d) 75 % oxygen

10. Signs of successful resuscitation are:

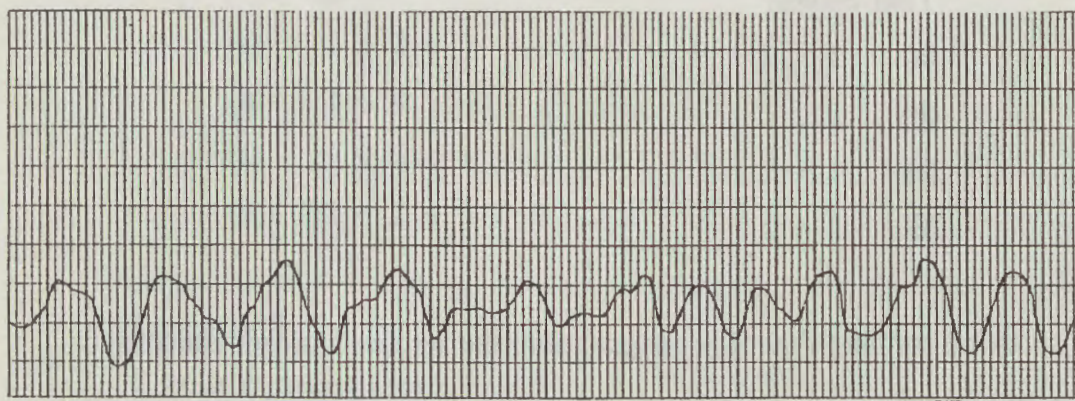
1. Narrowing of pupils.
2. Palpable pulses.
3. Improvement in colour.
4. Regaining of consciousness.

Your choice:

- (a) 1 + 2
- (b) 1 + 2 + 3 + 4
- (c) 3 + 4
- (d) 1 + 2 + 4

READ THROUGH THE FOLLOWING CASE STUDY AND STUDY THE ECG RHYTHM. THEN ANSWER THE FOLLOWING QUESTIONS:

You are admitting a male patient with chest pain. He is connected to a monitor. As you are about to leave his room, the alarm of the monitor goes off, and the reflected rhythm below appears on the monitor. He is unresponsive, a pulse is unobtainable and he is not breathing.



11. This rhythm indicates:

- (a) Ventricular fibrillation
- (b) Asystole
- (c) Ventricular tachycardia
- (d) Atrial fibrillation

12. The correct actions are as follows:

1. Administer a counter shock with the defibrillator at 200 Joules or Watts/sec.
2. Defibrillate the patient three times in succession.
3. Administer calcium chloride 5 ml I.V.

4. Administer Adrenaline 1 mg I.V.

Your choice:

- (a) 1 + 3
- (b) 1 + 4
- (c) 1 + 3 + 4
- (d) 1 + 2 + 4

13. Later the physician arrived, and prescribed lignocaine, 3 mg/kg as a bolus dose. The patient recovered but half an hour later started to convulse.

Your conclusions are:

- 1. Dose of lignocaine insufficient
- 2. Dose of lignocaine too high
- 3. Lignocaine might cause convulsion
- 4. It is an incorrect drug

Your choice:

- (a) 2 + 3
- (b) 2 + 3 + 4
- (c) 1 + 3 + 4
- (d) 4

14. During the resuscitation process, the nurse decides to intubate the patient (endotracheal).

Correct statements are as follows:

- 1. It reduces the risk of aspiration of gastric contents.
- 2. It serves as a route for the administration of adrenaline.
- 3. Should always be performed with the neck flexed forward, the head extended back and the occiput of the head elevated.
- 4. No resuscitation could be successful if the patient is not intubated.

Your choice:

- (a) 1 + 2
- (b) 2 + 3 + 4
- (c) 1 + 3
- (d) 2 + 4

15. Atropine 1.0 mg was prepared but not used.

Correct statements about atropine are as follows:

- 1. It abolishes bradycardia.
- 2. It decreases vagal reflexes.
- 3. It may lead to tachycardia.
- 4. Overdose may cause confusion in the patient.

Your choice:

- (a) 1 + 2
- (b) 2 + 3 + 4
- (c) 1 + 3 + 4
- (d) all of the above

16. After the resuscitation, Dopamine (Intropin) was initiated.

The rationale was:

- 1. It increases the blood pressure.
- 2. It improves renal blood flow at a low dose (dosis).
- 3. It decreases the pulse rate.
- 4. It terminates (stops) arrhythmia.

Your choice:

- (a) 1 + 2
- (b) 3 + 4
- (c) 1 + 3 + 4
- (d) 2 + 3 + 4

17. The following rhythm is an example of:



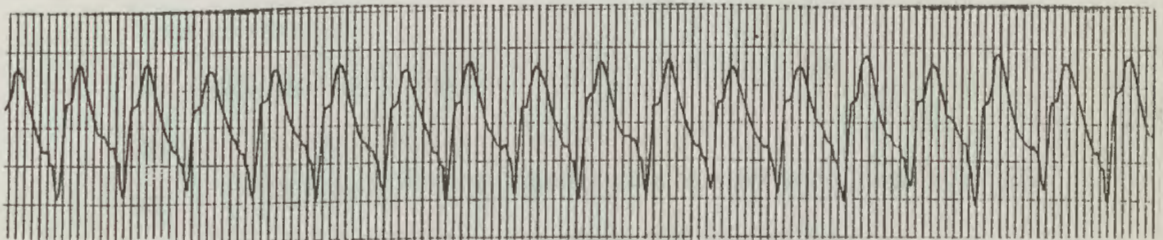
- (a) Sinus tachycardia
- (b) Ventricular tachycardia
- (c) Ventricular extrasystole (premature ventricular contractions)
- (d) Ventricular fibrillation

18. The following rhythm is an example of:



- (a) Sinus tachycardia
- (b) Asystole
- (c) Ventricular tachycardia
- (d) Ventricular fibrillation

19. The following rhythm is an example of:



- (a) Ventricular tachycardia
- (b) Asystole

- (c) Ventricular fibrillation
- (d) Ventricular extrasystole (premature ventricular contractions)

20. Adrenaline.

Correct statements are:

1. Increases heart rate.
2. Increases myocardial contraction.
3. Decreases blood glucose levels.
4. Decreases conduction of nerve impulses through the heart.

Your choice:

- (a) 1 + 2
- (b) 1 + 4
- (c) 3 + 4
- (d) 1 + 2 + 3 + 4

21. Adrenaline administration during cardiac arrest.

Correct statements are:

1. Administer 2 mg via endotracheal tube.
2. Administer 1 mg via intravenous line.
3. Administer 1 mg intramuscular.

Your choice:

- (a) 1 + 2 + 3
- (b) 1 + 2
- (c) 1 + 3
- (d) 2 + 3

22. Classify the type of shock from the following signs:

- Early sign is a warm dry skin.
- Cardiac output is greater initially.
- There is also a cold phase with a low cardiac output.

Your choice:

- (a) Hypovolemic shock
- (b) Cardiogenic shock
- (c) Septic shock
- (d) Anaphylactic shock

23. Classify the type of shock according to the signs and treatment presented below:

- Histamine is released into the bloodstream.
- Fluid replacement is not always indicated in the treatment.
- Adrenaline should be administered.
- Corticosteroids (Solu-Cortef) could be administered.

Your choice:

- (a) Hypovolemic shock
- (b) Cardiogenic shock
- (c) Septic shock
- (d) Anaphylactic shock

24. Classify the type of shock according to the signs below:

- Decreased preload.
- Not enough stretch for muscle fibres.
- Dopamine alone would not help.
- Often due to trauma.

Your choice:

- (a) Hypovolemic shock
- (b) Cardiogenic shock
- (c) Septic shock
- (d) Anaphylactic shock

25. The universal blood donor is:

- (a) Bloodgroup A, Rh negative
- (b) Bloodgroup AB, Rh positive
- (c) Bloodgroup O, Rh negative
- (d) Bloodgroup O, Rh positive

26. Classify the type of shock according to the signs and possible treatment presented:

- There is pulmonary congestion (Edema).
- Crystalloid fluid must not be administered.
- Vasopressors such as Adrenaline and Dopamine (Intropin) may be administered.
- There is a high preload.

Your choice:

- (a) Anaphylactic shock
- (b) Hypovolemic shock
- (c) Septic shock
- (d) Cardiogenic shock

27. Blood components.

Correct statements are:

1. Red blood cells (packed cells) are indicated for patients suffering from a combined deficit of oxygen carrying capacity and hypovolemia.
2. With massive blood transfusion, dilution of platelet with consequent bleeding may occur.
3. An albumin infusion is indicated in cardiogenic shock.
4. Fresh frozen plasma is primarily indicated for hypovolemic shock.

Your choice:

- (a) 1 + 2
- (b) 1
- (c) 2
- (d) 1 + 3 + 4

QUESTION 28 THROUGH 30 PERTAINS TO THE FOLLOWING SCENARIO:

A 75 year old woman is assisted into the emergency department by her son. Her chief complaints are malaise and weakness. She can barely walk and appears to be extremely weak.

She is unable to identify any associated history. Her son states that recently she had pain while urinating which is now resolved. He also states that she is normally up and about but now she is not herself.

The patient denies any pain, but she is disoriented. Her verbal response is slow. Her extremities are cool, clammy, and slightly mottled. Capillary refill takes 5 seconds. Her blood pressure and peripheral pulse oximetry (oxygen readings) are unobtainable.

Her vital signs are as follows: pulse, 124 beats/minute, weak and regular; respirations: 28 breaths/minute and temperature: 36.1 C.

28. The most ominous sign presented by this patient is:
- (a) Her temperature
 - (b) Her history of pain and burning when urinating
 - (c) The inability to obtain a blood pressure
 - (d) Her mottled extremities
29. The most immediate priority for this patient is:

- (a) Obtaining laboratory studies
- (b) Fluid therapy and vasopressors
- (c) Oxygen administration
- (d) Antibiotic therapy

Laboratory results for this patient reveal a white blood cell count of 35,000 cells/mm and arterial blood values as follows:

ph : 7,25
 HCO₃ : 12 mmol/L
 pCO₂ : 45 mmHg
 pO₂ : 75 mmHg

30. Which of the following interventions may be started initially?

- 1. Intravenous fluid.
- 2. Oxygen at 10 - 12 L/min by mask.
- 3. Dobutamine hydrochloride (Dobutrex).
- 4. Broad-spectrum antibiotics.

Your choice:

- (a) 2 + 4
- (b) 1 + 2 + 4
- (c) 2 + 3 + 4
- (d) 1 + 2 + 3 + 4

31. Tension Pneumothorax.

Correct statements are:

- 1. Frequently the result of a closed (simple) pneumothorax.
- 2. The trachea deviates to the affected side.
- 3. With auscultation the heart sounds are distant.
- 4. Distended neck veins may be present.

Your choice:

- (a) 1 + 2 + 3
- (b) 1 + 2 + 4
- (c) 1 + 3 + 4
- (d) 2 + 3 + 4

32. Tension Pneumothorax.

Correct statements are:

1. Tension must be relieved by needle thoracentesis.
2. If a nurse feels unsure about the above procedure, she should delay it because no harm will come to the patient.
3. The heart may be compressed.

Your choice:

- (a) 1 + 2
- (b) 2 + 3
- (c) 1 + 3
- (d) 1 + 2 + 3

33. Flail chest.

Correct statements are:

1. Due to fractures in more than one place in the same plane.
2. Fractures of the first and second ribs are the most common ones.
3. Characterized by paradoxical chest movements.
4. Splinting is the best way of treatment.

Your choice:

- (a) 1 + 2
- (b) 2 + 3
- (c) 1 + 3
- (d) 1 + 4

34. Traumatic Aorta Dissection.

Correct statements are:

1. The most common site involves the abdominal aorta.
2. There might be haemoptysis.
3. There might be a difference in blood pressure from right to left sides.

Your choice:

- (a) 1 + 2 + 3
- (b) 1 + 3
- (c) 2 + 3
- (d) 1 + 2

35. Haemothorax.

Correct statements are:

1. Signs include respiratory distress and mediastinal shift.
2. Blood-transfusion might be required.
3. A thoracostomy and chest tube insertion is required.

Your choice:

- (a) 1 + 3
- (b) 2 + 3
- (c) 1 + 2 + 3
- (d) 1 + 2

36. A male patient is admitted with the following signs. What is his diagnosis?

- Pulses paradoxes are present.
- Hypotension.
- Heart sounds are muffled.
- No evidence of visible blood loss.

Your choice:

- (a) Tension pneumothorax
- (b) Flail chest
- (c) Traumatic aorta dissection
- (d) Pericardial tamponade

READ THROUGH THE FOLLOWING CASE STUDY AND THEN ANSWER QUESTIONS 37 AND 38.

An explosion occurred in a factory. A 30 year old worker was struck in the right chest by flying debris and developed a sucking chest wound. You applied an occlusive dressing in the emergency department to close the wound, started an infusion and began administering oxygen.

After about ten (10) minutes, the patient's blood pressure began to fall, his pulse rate increased, and he began showing signs of restlessness and extreme respiratory distress.

37. What has probably happened?
- (a) The patient suffered a pulmonary embolism.
 - (b) The patient developed a tension pneumothorax on his right side.
 - (c) The patient developed pulmonary edema from fluid overload.
 - (d) The patient developed oxygen toxicity.
38. How would you treat this complications?
- (a) Administer oxygen under pressure.
 - (b) Give Furosemide and discontinue the infusion to combat fluid overload.
 - (c) Momentarily release the occlusive dressing covering the open chest wounds.
 - (d) Discontinue oxygen administration.

39. Severity of burn injury.

Correct statements are:

1. The extent of a burn is determined by calculation of the percentage of surface area burned.
2. The palm on the patient's hand is roughly equivalent to 3 % of the body surface area.
3. Assessment of the depth of the burn is a major factor in initial fluid resuscitation.
4. The Rule of Nines is a common method to determine the extent of the burn.

Your choice:

- (a) 1 + 2
- (b) 2 + 3
- (c) 1 + 4
- (d) 3 + 4

40. The severity of burn injuries is determined by:

1. The extent of the burn (% body surface area involved).
2. The depth of the burn wounds.
3. The age of the patient.
4. The gender of the patient.

Your choice:

- (a) 1 + 3 + 4
- (b) 2 + 3
- (c) 1 + 2 + 4
- (d) 2 + 3 + 4

41. Depth of burns.

Correct statements are:

1. A first-degree burn is also known as a partial-thickness burn.

2. A third-degree burn extends entirely through the epidermis and dermis.
3. Third-degree burns are extremely painful.

Your choice:

- (a) 1 + 2
- (b) 1 + 3
- (c) 2 + 3
- (d) 1 + 2 + 3

42. Part of the body burned.

The area of the body burned is important in determining severity.

Correct statements with regard to the above are as follows:

1. An example of a major burn is a second degree burn over 25 % body surface area.
2. All inhalation injuries are classified as major burn injuries.
3. Burns on the face and feet are classified as major burn injuries.

Your choice:

- (a) 1 + 2 + 3
- (b) 1 + 2
- (c) 2 + 3
- (d) 1 + 3

43. Fluid therapy for burn victims.

Correct statements are:

1. A burn greater than 20 % results in progressive hypovolemia.
2. The Parkland (Baxter) formula is as follows: 4 ml of solution per kilogram of body weight times percentage of burn up to 50 % of total body area.
3. The volume of intravenous fluid is adjusted to maintain a urine output of at least 3 - 4 ml/kg/hour.
4. Colloids are the preferred choice of fluids and must be administered

from the beginning of resuscitation.

Your choice:

- (a) 1 + 2
- (b) 2 + 3
- (c) 3 + 4
- (d) 1 + 4

44. Chemical burns.

Correct statements are:

1. Most chemicals will produce a full-thickness burn.
2. Unlike other chemicals, alkali causes a more superficial type of burn.
3. The most important action is to flush the area with tap water.
4. An acid burn should be neutralized with an alkali at the scene.

Your choice:

- (a) 1 + 2
- (b) 2 + 3
- (c) 2 + 4
- (d) 1 + 3

READ THROUGH THE FOLLOWING CASE STUDY AND THEN ANSWER QUESTIONS 45 AND 46.

A 50 year old handyman, while painting the emergency room, lit a cigarette and accidentally set himself on fire. He fell from the ladder with his clothes on fire and landed on the floor, unconscious.

45. Arrange the following steps of management in the correct order after you have put out the fire.

1. Administer oxygen.
2. Establish an intravenous infusion.

3. Cover the patient with a sterile sheet.
4. Dress any associated wounds and immobilize any associated fractures.
5. Establish an airway.

Your choice:

- (a) 3 + 4 + 5 + 1 + 2
 - (b) 5 + 1 + 2 + 4 + 3
 - (c) 1 + 2 + 3 + 4 + 5
 - (d) 5 + 3 + 4 + 1 + 2
46. Upon examining the patient, you find that he has suffered burns to the anterior and posterior surfaces of both legs, to the anterior trunk, and to the anterior and posterior surfaces of his left arm. What percentage of his body was burned?
- (a) 36 percent
 - (b) 45 percent
 - (c) 54 percent
 - (d) 63 percent

47. Interventions necessary to control increased intracranial pressure.

Correct statements are:

1. Facilitate venous return from brain.
2. Increase cerebral blood flow by hypoventilation of the patient.
3. Dexamethasone (Decadron) may help control cerebral edema.

Your choice:

- (a) 1 + 2
 - (b) 1 + 3
 - (c) 2 + 3
 - (d) 1 + 2 + 3
48. Basal skull fractures.

Correct statement(s) is(are):

1. Nasogastric tube has to be inserted to prevent vomiting with aspiration.
2. Instruct the patient not to blow his nose.
3. Encourage the patient to cough vigorously.

Your choice:

- (a) 2
- (b) 1 + 2
- (c) 1
- (d) 2 + 3

49. Basal skull fractures.

Correct statement(s) is(are):

1. May result in leakage of cerebrospinal fluid if dura is torn.
2. May result in bilateral ecchymotic eyes.
3. May result in leakage of cerebrospinal fluid through the ears.
4. Leakage of cerebrospinal fluid may cause decreased intracranial pressure.

Your choice:

- (a) 1 + 2 + 3 + 4
- (b) 1 + 3
- (c) 2 + 3 + 4
- (d) 2

50. Subdural haematoma (bleeding).

Correct statements are:

1. Usually caused by arterial bleeding.
2. May occur without trauma.
3. Lumbar puncture is done to confirm diagnosis.
4. Patient presents with signs of increased intracranial pressure.

Your choice:

- (a) 1 + 2
- (b) 2 + 4
- (c) 3 + 4
- (d) 4

51. Epidural (extradural) bleeding.

Correct statements are:

1. Usually caused by arterial bleeding.
2. Usually caused by venous bleeding.
3. Bleeding on the left side would always cause pupil dilation on the right side.
4. The "Lucid period" often accompanies epidural bleeding.

Your choice:

- (a) 1 + 3
- (b) 2 + 3 + 4
- (c) 1 + 4
- (d) 1 + 3 + 4

52. Which of the following is the most sensitive indicator of increasing intracranial pressure?

- (a) Blood pressure
- (b) Level of consciousness
- (c) Cushing's reflex
- (d) Pulse volume

53. A patient is admitted to your ward drowsy and with multiple fractures. The limited history available on admission is:

- Victim of a motor vehicle accident
- Head struck roof of car
- Unconscious when ambulance personnel arrived but rapidly -

- regained consciousness

Your diagnosis is:

- (a) Epidural haematoma
- (b) Subarachnoid haemorrhage
- (c) Acute subdural haematoma
- (d) Chronic subdural haematoma

54. You are told that a head injured patient has a Glasgow Coma Scale Score of 8. You know that all of the following abilities were assessed, except:

- (a) Eye opening
- (b) Vital signs
- (c) Motor response
- (d) Verbal response

55. A hypertensive patient complains of a sudden severe headache. He/she is at greater risk for:

- (a) Onset of migraine headaches
- (b) Vasovagal syncope due to pain
- (c) Ruptured intracranial aneurysm
- (d) Epidural haematoma

56. Most intracranial (berry) aneurysms occur in the:

- (a) Middle meningeal artery
- (b) Anterior vessels of the circle of Willis
- (c) Basilar artery
- (d) External carotid arteries

57. Spinal shock.

Correct statements are:

1. There is hypotension.
2. There is hyperthermia.
3. There is tachycardia.
4. Paralytic ileus may also be a sign.

Your choice:

- (a) 1 + 2 + 3 + 4
- (b) 1 + 2
- (c) 1 + 4
- (d) 2 + 3

58. Brown-Séquard Syndrome.

Correct statements are:

1. Due to a transverse hemisection of the cord.
2. Pain and temperature sensations are lost on the opposite side of the injury.
3. This syndrome does not have a good prognosis.

Your choice:

- (a) 1 + 2
- (b) 3
- (c) 1 + 2 + 3
- (d) 2 + 3

59. Complete spinal cord injuries above C3 - C5.

Correct statements are:

1. Result in total loss of spontaneous respirations.
2. Nerve fibres responsible for respiratory function include C3 - C5 innervating the diaphragm.
3. Victims will have shallow ventilation.

Your choice:

- (a) 1 + 2
- (b) 1
- (c) 3
- (d) 2 + 3

60. Emergency management of spinal cord injuries.

Correct statements are:

1. All patients must be kept Nil per Os.
2. Methylprednisolone (Solu-Medtrol) is given.
3. Nasogastric tubes are withheld at first to prevent further damage to the spinal cord.

Your choice:

- (a) 2 + 3
- (b) 1 + 3
- (c) 1 + 2
- (d) 2

61. Prevention of further injuries to the spinal cord.

Correct statements are:

1. At the scene of the injury the neck should be stabilized in a neutral position.
2. Extension should be applied at the scene of injury to prevent dislocation of Axis.
3. Cervical traction should be applied as soon as possible at the scene of the accident.
4. Diuretics may be used to minimize oedema formation.

Your choice:

- (a) 1 + 2 + 3
- (b) 1 + 4
- (c) 3 + 4
- (d) 2 + 3

62. Airway management in patients with spinal cord injuries.

1. Safest method to establish an open airway is to use to modified jaw thrust or chin lift method.
2. Orotracheal (by mouth) intubation is the preferred method for airway control.
3. Elective intubation must include administration of atropine.
4. Patients with injuries above T12 may lose the ability to cough and so need help to clear their airway.

Your choice:

- (a) 1 + 2 + 3
- (b) 1 + 4
- (c) 3 + 4
- (d) 2 + 3

63. Assessment of spinal cord.

Correct statements are:

1. Palpation of the spine helps little in the assessment.
2. Rectal examinations should be avoided because it may cause spinal shock.
3. Sensory examination must identify any deficit of pain.
4. Sensory examination must identify any deficit of temperature and fine touch.

Your choice:

- (a) 1 + 2 + 4
- (b) 1 + 2
- (c) 2 + 3
- (d) 3 + 4

64. Assessment of the spinal cord.

Correct statements are:

1. Open mouth X-rays should also be taken.
2. Evidence of priapism in spinal cord injuries is considered a sign of neurological recovery.
3. Rupture of the bladder is a possible complication in spinal cord injuries.

Your choice:

- (a) 1 + 2 + 3
- (b) 1 + 2
- (c) 1 + 3
- (d) 2 + 3

65. Respiratory assessment.

Correct statements are:

1. Respiratory parameters include vital capacity.
2. Respiratory parameters include tidal volume.
3. The patient must have a vital capacity of at least 7 ml/kg.
4. A respiratory rate of 12 - 14/minute is a reliable indication of ventilatory function.

Your choice:

- (a) 1 + 2 + 3 + 4
- (b) 2 + 3
- (c) 1 + 3
- (d) 1 + 2 + 4

66. Coping of the patient.

Correct statements are:

1. During the acute phase the patient and family is more concerned with information than physical or emotional needs.
2. Tests and procedures must be explained.
3. The full extent of the prognosis should never be told to the patient.

Your choice:

- (a) 1 + 2 + 3
- (b) 1 + 2
- (c) 2
- (d) 1 + 3

67. Seizures.

- (a) The causes are divided into chemical and neurological.
- (b) Partial seizures are brief episodes of loss of consciousness.
- (c) With absence seizures the patient usually stops all motor activity abruptly.
- (d) From the onset, focal seizures involves the whole body.

68. Etiology of seizures.

Correct statements are:

1. Head trauma.
2. Infection.
3. Vasogenic shock.

4. Cardiogenic shock.

Your choice:

- (a) 2 + 3 + 4
- (b) 1 + 2
- (c) 1 + 2 + 4
- (d) 3 + 4

69. Clinical manifestations of seizures.

Correct statements are:

1. An aura precedes absence seizures.
2. In tonic-clonic seizures there is only a brief loss of contact with the environment.
3. Psychomotor seizures may present as elaborate behavioural alteration.
4. Absence (petitmal) seizures are not usually seen in patients older than 16 years.

Your choice:

- (a) 1 + 2 + 3
- (b) 3 + 4
- (c) 1 + 4
- (d) 1 + 2 + 4

70. Status epilepticus.

Correct statements are:

1. Hyperthermia might occur.
2. Withdrawal from anticonvulsant medications might be the cause.
3. Absence seizures do not develop into status.
4. Hypoglycaemia may be a precipating cause.

Your choice:

- (a) 1 + 2 + 3
- (b) 3 + 4
- (c) 1 + 2
- (d) 1 + 2 + 4

71. A patient is admitted with status epilepticus. What are the procedure to be followed?

1. The first priority is an open airway.
2. Administer Diazepam (Valium) 10 - 20 mg IV.
3. Analyse blood for glucose, sodium, potassium and calcium.
4. Obtain toxic screen for drugs.

Your choice:

- (a) 2 + 4
- (b) 1 + 3
- (c) 1 + 2 + 3
- (d) 1 + 2 + 3 + 4

QUESTION 72 - 80 REFER TO THE FOLLOWING CASE STUDY:

Ben Uirab, a 17 year old male is admitted to your ward in a comatose state. He has poor skin turgor, scant urine output, a blood pressure of 85/50 and a pulse of 130 beats/minute. Diabetic ketoacidosis (DKA) is diagnosed.

72. Precipitating factors in the development of DKA include:

- (a) Failure to take, or resistance to insulin
- (b) Pancreatitis
- (c) Surgery or trauma in a patient with diabetes mellitus
- (d) All of the above

73. The patient with DKA typically presents with all of the following except:
- (a) Acetone breath odour and slow respiration
 - (b) Polyuria and signs of dehydration
 - (c) Altered level of consciousness and kussmaul's respiration
 - (d) Tachycardia and possible hypotension
 - (e) All of the above
74. Ben Uirab is at risk for which complications?
- (a) Hyperkalemia
 - (b) Oliguria
 - (c) Hypercalcemia
 - (d) Hypokalemia
75. A common and serious complication of diabetic keto acidosis for the diabetic patient is:
- (a) Respiratory acidosis
 - (b) Shock from dehydration
 - (c) Hyperkalemia
 - (d) Metabolic alkalosis
76. Complications from diabetic keto acidosis and its treatment include:
- (a) Shock and cardiac dysrhythmias
 - (b) Pulmonary and cerebral edema
 - (c) Hypoglycaemia and hypokalemia
 - (d) All of the above

77. Gluconeogenesis is the formation of glucose from:
- (a) Carbohydrates
 - (b) Non-carbohydrate sources
 - (c) Glycogen
 - (d) Vitamins
78. Factors that may precipitate diabetic keto acidosis include:
- (a) Weight reduction
 - (b) Exercise
 - (c) Stress
 - (d) Low carbohydrate diet
79. Insulin therapy for diabetic ketoacidosis results in which of the following changes?
- (a) Increased cellular potassium
 - (b) Decreased cellular potassium
 - (c) Increased serum glucose
 - (d) Increased serum potassium
80. Dehydration in diabetic keto acidosis results primarily from:
- (a) ADH deficiency
 - (b) Aldosterone hyper-activity
 - (c) Osmotic diuresis
 - (d) Diminished oral intake
81. Mr P. is admitted to the recovery room. Due to severe pain morphine is prescribed. Ten minutes after administration, the patient develops apnoea. Which of the following drugs would you administer as an antidote?

- (a) Atropine
- (b) Neostigmine
- (c) Narcan
- (d) Adrenaline

82. Mr. P. recovers, and is placed on a monitor. The following rhythm appears on the oscilloscope.



The rhythm is:

- (a) Normal (sinus rhythm)
 - (b) Ventricular fibrillation
 - (c) Ventricular tachycardia
 - (d) Premature ventricular contractions (PVC's) extracystoles
83. The drugs of choice for the treatment identified in question no. 82 is:
- (a) Adrenaline
 - (b) Lignocaine
 - (c) Atropine
 - (d) Dopamine
84. Which of the following signs would be a first indication of the recovery of anaesthesia?
- (a) Swallow reflex

- (b) Return of consciousness
- (c) Vomiting reflex
- (d) Coughing reflex

85. The patient, Mr. P., also received a non-depolarising muscle relaxant in the operating room. This muscle relaxant was reversed by a second drug. Unfortunately this second drug caused some side-effect like increase in saliva and decreased heart rate.

Therefore a third drug is added - to counteract this side-effects (muscarinic effects) of drug no. 2. The three drugs in discussion are:

- (a) Succinylcholine (Scoline), pancuronium bromide (Pavulon) and neostigmine
- (b) Pancuronium bromide (Pavulon), adrenaline and atropine
- (c) Pancuronium bromide (Pavulon), neostigmine and atropine
- (d) Succinylcholine (Scoline), adrenaline and atropine

86. Design features and equipment requirements of the recovery room are as follows:

1. Each bed must be provided with an oxygen and suction outlet
2. Each bed must be provided with two general power outlets
3. Each bed should have a wall clock with a sweep second-hand
4. There must be an ECG/peripheral pulse monitor
5. There should be easy access to a defibrillator

Your choice:

- (a) 2 + 3
- (b) 4 + 5
- (c) 1 + 2 + 3 + 4 + 5
- (d) 1 + 3

87. Malignant hyperpyrexia is rare and usually occurs during induction or maintenance of anaesthesia. However, it may also occur post-operatively. This condition manifests as follows:

1. Generalized contraction of skeletal muscles.
2. Bradycardia.
3. Tachycardia.
4. Cardiac dysrhythmias.
5. Hypoxia.

Your choice:

- (a) 1 + 2 + 5
- (b) 1 + 3 + 4 + 5
- (c) 2 + 4
- (d) 3 + 4 + 5

88. There is no pulse oximeter available in the recovery room. You are suspecting that the patient is suffering from hypoxemia. Clinical signs and symptoms of hypoxemia are as follows:

1. Restlessness.
2. Hypertension.
3. Facial sweating.
4. Tachycardia.
5. Yawning.

Your choice:

- (a) 1 + 4 + 5
- (b) 1 + 3 + 4 + 5
- (c) 1 + 2 + 3 + 5
- (d) 2 + 3

89. Part of your respiratory assessment includes auscultation of the lungs.

1. Crackles can be mimicked by rubbing a few pieces of hair together near one's ear.
2. Crackles may imply that air is moving through secretions.
3. A wheeze (high-pitched sound) indicates a narrowing in the airways as in asthma.
4. Rhonchi indicates narrowed airways like in asthma.

Your choice:

- (a) 1 + 2
- (b) 1 + 2 + 3
- (c) 1 + 3 + 4
- (d) 3 + 4

90. Signs of an adequate functioning cardiovascular system are:

1. Systolic blood pressure above 100 mmHg.
2. Pulse rate between 60 and 100 per minute (adults).
3. Adequate urine output.
4. Warm feet.
5. Palpable feet pulses.

Your choice:

- (a) 1 + 2 + 3 + 4 + 5
- (b) 1 + 3 + 4
- (c) 1 + 2 + 5
- (d) 3 + 5

91. The scope of practice of persons registered.

Correct statements are:

1. Procedures and tasks first have to be listed.
2. Nightingales theory forms the framework for the scope of practice.
3. The scope is an authorization of what nurses may not do.
4. When identifying a medical condition, the nurse makes a nursing

diagnosis.

Your choice:

- (a) 1 + 2 + 3 + 4
- (b) 1 + 3 + 4
- (c) 1 + 3
- (d) 2 + 4

92. Duty to take care.

Correct statements are:

1. Duty to take care means to be careful.
2. The *diligence paterfamilias* is the level of care that should be exercised by every citizen.
3. The nurse has a greater duty "to take care" than the ordinary citizen.
4. To act "with due care" requires knowledge, judgemental skills and competence.

Your choice:

- (a) 1 + 2 + 3 + 4
- (b) 1 + 3
- (c) 2 + 4
- (d) 1 + 2 + 4

93. Negligence in nursing practice.

Correct statement(s) is(are):

1. A doctor is responsible for the negligence of nurses that work in his team.
2. Absence of "due care" may be regarded as negligence.
3. When a nurse does not protect the rights of a patient it might be considered negligence.

Your choice:

- (a) 1
- (b) 1 + 2 + 3
- (c) 2 + 3
- (d) 1 + 3

94. Ethical issues.

Correct statement(s) is(are):

1. An ethical misdemeanour may result in disciplinary action.
2. Ethical issues are mainly the concern of nursing managers and hospital administrators.
3. With careful consideration, all ethical problems can be resolved.

Your choice:

- (a) 1
- (b) 2
- (c) 1 + 2 + 3
- (d) 2 + 3

95. Recordkeeping and communication.

Correct statement(s) is(are):

1. During emergency situations, recordkeeping is minimized.
2. Verbal communication is not legally accepted in court cases.
3. Many legal problems can be attributed to faulty communications.

Your choice:

- (a) 1 + 2 + 3
- (b) 1
- (c) 3
- (d) 2 + 3

TRUE OR FALSE QUESTIONS

Indicate on your answer sheet whether the following statements are true or false. If true, make an "X" over a and if false, make a "X" over b.

96. Legally it is expected of the nurse to keep herself/himself up to date.
- a. True
 - b. False
97. The nurse has an obligation to act as whistleblower when her peers act incompetently.
- a. True
 - b. False
98. When a replacement is available, it is morally permissible for a nurse to refuse to participate in withdrawing or with-holding therapy on grounds of personal religious.
- a. True
 - b. False
99. The patient has a right to refuse nursing care in an emergency situation.
- a. True
 - b. False

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98. When a replacement is available, it is morally permissible for a nurse to refuse to participate in withdrawing or with-holding therapy on grounds of personal religious.
- a. True
 - b. False
99. The patient has a right to refuse nursing care in an emergency situation.
- a. True
 - b. False

100. For the professional nurse, when acting in emergency situations, professional negligence means the failure to do what the reasonable prudent medical doctor would do under similar circumstances.

- a. True
- b. False

MEMORANDUM FOR POST EVALUATION TEST

Allocation of marks: One (1) correct answer = 1 point

1	c	21	b	41	a	61	b	81	c
2	a	22	c	42	b	62	a	82	d
3	c	23	d	43	a	63	d	83	b
4	d	24	a	44	d	64	c	84	d
5	c	25	c	45	b	65	a	85	c
6	b	26	d	46	d	66	b	86	c
7	d	27	a	47	b	67	c	87	b
8	d	28	d	48	a	68	b	88	a
9	b	29	b	49	b	69	b	89	b
10	b	30	c	50	b	70	d	90	a
11	a	31	c	51	c	71	d	91	d
12	d	32	c	52	b	72	d	92	a
13	a	33	c	53	a	73	a	93	c
14	a	34	c	54	b	74	d	94	a
15	d	35	c	55	c	75	b	95	d
16	a	36	d	56	b	76	c	96	a
17	c	37	b	57	d	77	b	97	a
18	d	38	c	58	a	78	c	98	a
19	a	39	c	59	a	79	a	99	a
20	a	40	b*	60	c	80	c	100	b

COURSE (LEARNING FACILITIES) EVALUATION FORM

This evaluation form is to be completed by participants who have studied the Learning Facilities (LFA) and the participant information.

1. Indicate your code in the space below.

[Empty rectangular box for code entry]

2. Indicate to which year you are referring in the following questions.

ANNEXURE D

GROUP A	1	
GROUP B	2	

Instructions

There are different types of questions included in the questionnaire. Please answer them as follows:

Some questions require a response in the right hand space.

Some questions are asked on a five point Likert scale which may have anchors. For example:

In-service education is:

Very important [1] [2] [3] [4] [5] Very important

If you have decided that it is not very important, please tick a 5, and if it is very important, please tick a 1.

COURSE (LEARNING PACKAGES) EVALUATION FORM

This evaluation form is to be completed by participants who have studied the learning packages - Group A and C.

Participant information

1. Indicate your code in the space below:

--

2. Indicate to which group you belong by putting an ("X") in the relevant column below.

		Put the cross in this column
GROUP A	1	
GROUP C	2	

Instructions

There are different types of questions included in the questionnaire. Please answer them as follows:

- Some questions need only a cross (X) in the applicable space
- Some questions are stated in the form of a rating scale which you have to rate, for example:
In-service education is?

Very important

5	X	3	2	1
---	---	---	---	---

Not important

If you have decided that it is very important, however not a 5, but a 4, then you make a cross (X) over the 4.

3. Objectives

The objectives of all eleven packages were:

3.1	Helpful	5	4	3	2	1	Not helpful
3.2	Understandable	5	4	3	2	1	Not understandable
3.3	Sufficient	5	4	3	2	1	Insufficient
3.4	Appropriate	5	4	3	2	1	Inappropriate

3.5 Any comments regarding the objectives?

4. Learning activities

Were the:

	YES (1)	NO (2)	NOT APPLI- CABLE (3)
4.1 Reading lists sufficient?			
4.2 Additional readings available?			
4.3 Coordinators/mentors available for help?			

4.4 Any comments on the learning activities?

5. Allotted time span:

	YES (1)	NO (2)	NOT APPLI- CABLE (3)
5.1 Sufficient			
5.2 Too short			
5.3 Too long			

6. Individual learning packages

Indicate in the relevant space if you experienced problems with any of these packages.

	EXPERIENCED PROBLEMS WITH (1)	NO PROBLEMS (2)	NOT APPLI- CABLE (3)
6.1 BASIC LIFE SUPPORT			
6.2 ADVANCED CARDIAC LIFE SUPPORT			
6.3 SHOCK			
6.4 BURN INJURIES			
6.5 BLUNT INJURIES			
6.6 IMMEDIATE AND SHORT TERM TREATMENT OF HEAD INJURIES			
6.7 IMMEDIATE AND SHORT TERM TREATMENT OF SPINAL CORD INJURIES			
6.8 SEIZURES			
6.9 DIABETIC KETO- ACIDOSIS			
6.10 RECOVERY ROOM NURSING			
6.11 SELECTED LEGAL AND ETHICAL ASPECTS			

6.12 Any comments with regard to the problems experienced?

Do you think there is a need for the topics dealt with in these packages?

	THERE IS A NEED (1)	NO NEED (2)	NOT APPLI- CABLE (3)
7.1 BASIC LIFE SUPPORT			
7.2 ADVANCED CARDIAC LIFE SUPPORT			
7.3 SHOCK			
7.4 BURN INJURIES			
7.5 BLUNT CHEST TRAUMA			
7.6 IMMEDIATE AND SHORT TERM TREATMENT OF HEAD INJURIES			
7.7 IMMEDIATE AND SHORT TERM TREATMENT OF SPINAL CORD INJURIES			
7.8 SEIZURES			
7.9 DIABETIC KETO- ACIDOSIS			
7.10 RECOVERY ROOM NURSING			
7.11 SELECTED LEGAL AND ETHICAL ISSUES			

8. How would you describe your knowledge level after completion of these packages?

**Drastic
improvement**

5	4	3	2	1
---	---	---	---	---

No improvement

9. How would you describe your psychomotor performance (skills performance) after completion of these packages?

Drastic
improvement

5	4	3	2	1
---	---	---	---	---

No improvement

10. How would you describe your confidence level in dealing with critical care situations (resuscitation, etc.) after completion of these packages?

Drastic
improvement

5	4	3	2	1
---	---	---	---	---

No improvement

11. Post-test

After completion of the post-test, do you think that:

	YES (1)	NO (2)	NOT APPLI- CABLE (3)
11.1 The questions were fair?			
11.2 The questions relate to the objectives?			
11.3 The questions were understandable?			
11.4 The questions concentrated on important aspects?			

12. Any other suggestions for improvement of learning packages?

Thank you for your effort and time in participating in this experiment!

L.F. SMALL

ANNEXURE E

This questionnaire is designed to collect information on the coordination of research activities between the participants in the research project.

INSTRUCTIONS

There are different types of questions in this questionnaire. Please answer each question as follows:

- Some questions have a space for you to write your answer.
- Some questions are marked with a scale which you should mark on the appropriate number.

ANNEXURE E

Very Important Important Not important

If you have decided not to participate in the research project, please return this questionnaire to the researcher.

1. The topics discussed in this questionnaire are applicable to your research project.

2. There is a need for this information for regulated research.

Do you think there is a need for this information in the following areas?

PRODUCT EVALUATION

This evaluation form is to be completed by the coordinator/mentor or appointed person evaluating the participants who have completed the learning packages.

INSTRUCTIONS

There are different types of questions included in the questionnaire. Please answer them as follows:

- Some questions need only a cross (X) in the applicable space.
- Some questions are stated in the form of a rating scale which you have to rate, for example: In-service education is?

Very important

5	4	3	2	1
---	--------------	---	---	---

 Not important

If you have decided that it is very important, however not a 5, but a 4, then you make your cross (X) over the 4.

1. The topics dealt with in these packages were:

Applicable

5	4	3	2	1
---	---	---	---	---

 Not applicable

2. There is a need for such independent learning material for registered nursing.

Definitely

5	4	3	2	1
---	---	---	---	---

 Unnecessary

Do you think there is a need for the topics dealt with in the following packages?

	YES (1)	NO (2)	NOT APPLI- CABLE (3)
3.1 BASIC LIFE SUPPORT			
3.2 ADVANCED CARDIAC LIFE SUPPORT			
3.3 SHOCK			
3.4 BURN INJURIES			
3.5 BLUNT CHEST TRAUMA			
3.6 IMMEDIATE AND SHORT TERM TREAT- MENT OF HEAD INJURIES			
3.7 IMMEDIATE AND SHORT TERM TREAT- MENT OF SPINAL CORD INJURIES			
3.8 SEIZURES			
3.9 DIABETIC KETOACIDOSIS			
3.10 RECOVERY ROOM NURSING			
3.11 SELECTED LEGAL AND ETHICAL ISSUES			

4. How would you describe the participants knowledge level after completion of the learning packages?

Noticeable improvement

5	4	3	2	1
---	---	---	---	---

 No improvement

4.1 Any comments with regard to their knowledge level?

5. How would you describe the participants psychomotor performance (skills performance) after completion of the learning packages?

Noticeable improvement

5	4	3	2	1
---	---	---	---	---

 No improvement

5.1 Any comments with regard to the participants psychomotor performance?

6. How would you describe the participants confidence level in dealing with critical care situations (resuscitation, etc.) after completion of the packages?

Noticeable improvement	5	4	3	2	1	No improvement
------------------------	---	---	---	---	---	----------------

6.1 Any comments with regard to the participants confidence level?

7. Do you have any suggestions for possible improvements of the learning packages?

Thank you for your effort and time!

L.F. SMALL

BIOGRAPHICAL AND CAREER INFORMATION

1. Indicate your rank in the space below:

[Empty box for rank]

2. Indicate to which group you belong or possibly do ("A" in the table below)

(A)	(B)	(C)
GROUP A	GROUP B	GROUP C

3. Gender

1. MALE	
2. FEMALE	

ANNEXURE F

4. Age

1. 21-25 years	
2. 26-30 years	
3. 31-35 years	
4. 36-40 years	
5. 41-45 years	
6. More than 45 years	

5. Years of previous work experience in a general category

1. 1-3 years	
2. 3-5 years	
3. 6-8 years	
4. 9-11 years	

BIOGRAPHICAL AND CAREER INFORMATION

1. Indicate your code in the space below:

--

2. Indicate to which group you belong by putting an ("X") in the relevant column below.

(1)	(2)	(3)	(4)
GROUP A	GROUP B	GROUP C	GROUP D

3. Gender

1. MALE	
2. FEMALE	

4. Age

1. 21-25 years	
2. 26-30 years	
3. 31-35 years	
4. 36-40 years	
5. 41-45 years	
6. Above 45 years	

5. Years of practice since qualification as a general nurse:

1. < 2 years	
2. 2-5 years	
3. 6-7 years	
4. > 7 years	

6. Years of experience in either an intensive care unit or an emergency department:

1.	None	
2.	< 6 months	
3.	7-12 months	
4.	13 months - 2 years	
5.	> 2 years	

7. Registration in any of the following post-basic qualifications?

	YES (1)	NO (2)	NOT APPLI- CABLE (3)
7.1 Operating Room Nursing			
7.2 Orthopaedic Nursing			
7.3 Community Health Nursing			
7.4 Psychiatric Nursing			
7.5 Nursing Education			
7.6 Nursing Management			
7.7 Trauma Nursing			
7.8 Paediatric Nursing			

8. Any other post-basic qualifications? List them.

9. Did you obtain any of the following degree qualifications?

	YES (1)	NO (2)	NOT APPLI- CABLE (3)
9.1 B. Cur. (Basic generic nursing degree)			
9.2 B.A. Cur. (UNISA) or B.Cur. (Prog. Prax.) (UNAM) or any other post-registration nursing degree			
9.3 Hons. Nursing Degree			
9.4 Magister in Nursing			

10. Employer:

1. State	
2. Private	

THANK YOU FOR YOUR EFFORT AND TIME!

L.F. SMALL

LEARNING PACKAGES

ANNEXURE G

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1. INTRODUCTION

2. TARGET GROUP

SUBJECT **LEARNING PACKAGE NO. 1**

3. THEME

4. PACKAGE DESCRIPTION

5. OBJECTIVES

6. CONTENT

7.1. Content outline

7.2. Content

7.3. **BASIC LIFE SUPPORT**

8. LEARNING ACTIVITIES

9. SELF-EVALUATION

10. LIST OF REFERENCES

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- * Obtain this "additional information" by proceeding through the learning activities.
- * Evaluate your own performance by completion of the self-evaluation questions.
- * This package must be fully mastered before you proceed to the following packages.

NOTE: This package does not include a pre- and post-test. The pre- and post-testing will be done on a separate occasion.

6. OBJECTIVES

On completion of this learning package you should be able to:

- 6.1 Define cardiac arrest.
- 6.2 Distinguish between biological and clinical death.
- 6.3 Describe the signs and symptoms of cardiac arrest.
- 6.4 Explain what is meant by assessing the safety of the surroundings when performing cardio-pulmonary resuscitation.
- 6.5 Demonstrate on a manikin how you will ensure an open airway.
- 6.6 Demonstrate the following on a manikin:
 - 6.6.1 Mouth-to-mouth breathing.
 - 6.6.2 Resuscitator bag-to-mouth breathing.
 - 6.6.3 Resuscitator bag-to-endotracheal tube breathing.
- 6.7 Demonstrate on a colleague/manikin how you will assess the cardiac circulation of a patient (adult and child).

- * Obtain this "additional information" by proceeding through the learning activities.
- * Evaluate your own performance by completion of the self-evaluation questions.
- * This package must be fully mastered before you proceed to the following packages.

NOTE: This package does not include a pre- and post-test. The pre- and post-testing will be done on a separate occasion.

6. OBJECTIVES

On completion of this learning package you should be able to:

- 6.1 Define cardiac arrest.
- 6.2 Distinguish between biological and clinical death.
- 6.3 Describe the signs and symptoms of cardiac arrest.
- 6.4 Explain what is meant by assessing the safety of the surroundings when performing cardio-pulmonary resuscitation.
- 6.5 Demonstrate on a manikin how you will ensure an open airway.
- 6.6 Demonstrate the following on a manikin:
 - 6.6.1 Mouth-to-mouth breathing.
 - 6.6.2 Resuscitator bag-to-mouth breathing.
 - 6.6.3 Resuscitator bag-to-endotracheal tube breathing.
- 6.7 Demonstrate on a colleague/manikin how you will assess the cardiac circulation of a patient (adult and child).

- 6.8 Demonstrate on a minikin the compressing of the sternum (adult and child).
- 6.9 Describe the following theoretical points with regard to:
- 6.9.1 Rate of sternum compression.
- 6.9.2 Depth of sternum compression.
- 6.9.3 Sequence between sternum compression and delivering of breaths.
- 6.10 Differentiate between adult and child resuscitation.
- 6.11 Explain how you will deal with an obstructed airway.
- 6.12 Explain your decision in the following situations:
- 6.12.1 Termination of cardiopulmonary resuscitation.
- 6.12.2 Being confronted with the following:
- (a) Living Will
- (b) Do not resuscitate orders, explain your action(s).
- 6.13 Explain what is meant by "Brain death".

7. CONTENT

7.1

Content outline

- Definitions
- Signs and symptoms of cardiac arrest
- Environmental safety
- Airway maintenance
- Breathing maintenance
- Determination of circulation
- Performing compressions
- Difference between adult and child resuscitation
- Decision-making in resuscitation

7.2

Concepts

- Clinical death
- Biological death
- Brain death
- "Head tilt-chin lift manoeuvre"
- "Jaw-thrust manoeuvre"
- Living Will
- Do not resuscitate orders

7.3 **What is where?**

Basic Life Support entails the very essence of life, namely a supply of air, functioning lungs and a contracting heart. Thus, Basic Life Support is best known as the A.B.C. management of "life".

The meaning of the A.B.C. is as follows:

A = airway
B = breathing
C = circulation

This "A.B.C." is reserved for cardiopulmonary arrest in adults and children. In infants, it is usually the respiratory component that needs attention.

Cardiopulmonary arrest is defined as the cessation of breathing and circulation, and this signifies death. Definite action must be taken within 4 - 6 minutes.

STUDY:

Treatment manual for clinics, P. 1

- (a) Causes of sudden death
- (b) Signs of cardio-pulmonary arrest

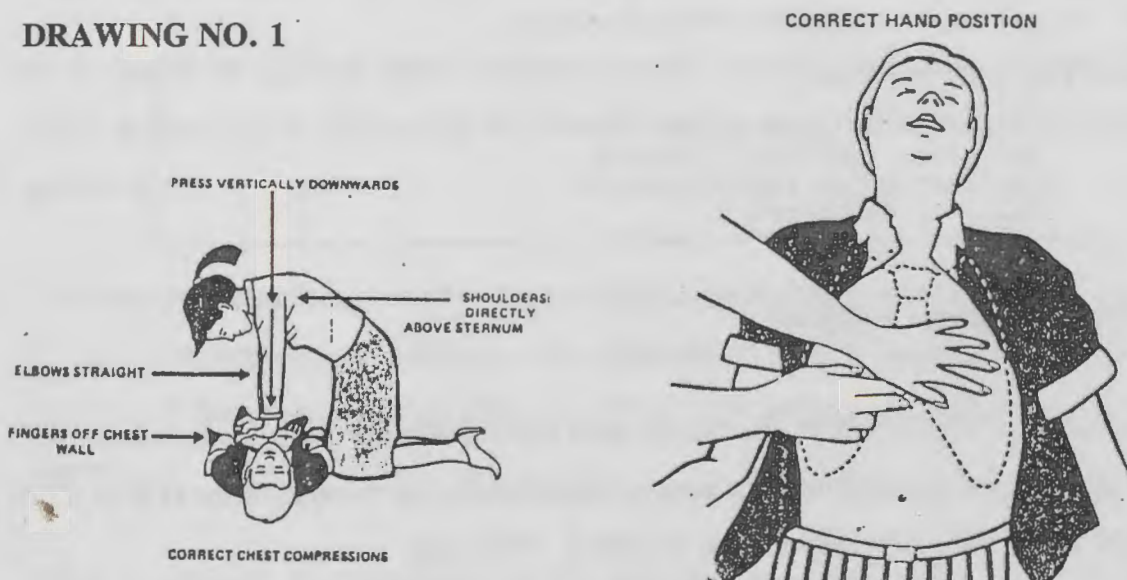
NOTE:

This manual is the prescribed protocol of the Ministry of Health and Social Services in Namibia. Every clinic and hospital is in possession of this manual.

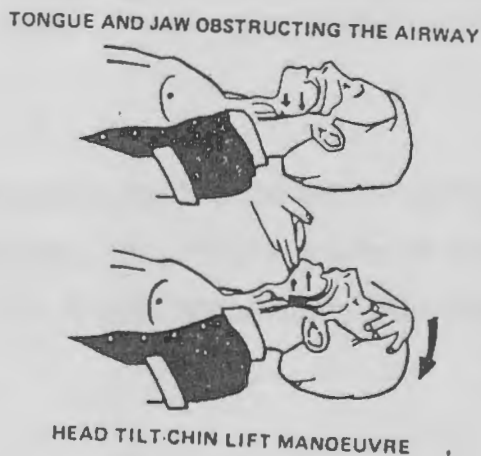
NOTE:

The following drawings are taken from Kloeck, W.: "Basic Cardio-pulmonary Resuscitation - New Recommendations", (Kloeck, 1988:819).

DRAWING NO. 1



DRAWING NO. 2



STUDY:

Searle, C. and
Pera, S.
1992

Professional Practice
A South African Perspective
Second Edition
Chapter 4: The public's right to
safe nursing practice.

Concentrate on what she writes on "Living Will".

In a chapter in "Critical Care" edited by Civetta, Taylor and Kirby (1988:121-124) wrote on termination of resuscitation. The following are quotations extracted from this publication.

"A prime consideration in withholding or terminating treatment is the competent refusal of such treatment by an individual. The presence of a valid Will may come to the attention of the physician responsible for the patient's management during the cardiac arrest".

"This is adequate documentation for the individual's expression of desire to avoid heroic efforts and adequate for the physician to substantiate such a desire. In the presence of a Living Will the physician may feel more comfortable in not beginning, restricting or terminating resuscitation".

"However, Living Wills often fail to describe what artificial means are acceptable and may fail to consider what artificial means are acceptable and may fail to consider legal limitations imposed by the state (i.e., pregnancy or dependent children). Therefore, a resuscitation once begun should aggressively be continued until these details are clarified".

"Do not resuscitate orders" should be honoured when appropriately should never have begun on such a patient, but, if begun before the DNR orders are discovered and verified, it should be stopped expeditiously once this is realized." (Civetta et al, 1988:121-124).

8. LEARNING ACTIVITIES

To enable you to master the objectives, the following learning activities are recommended.

(a) Consult the reading list

You will find this reading list with the coordinator. See the cover letter that you have received with the learning package.

(b) Study

- (i) Ministry of Health and Social
Services
(no date)

Treatment Manual for Clinics

Windhoek: Ministry of Health and
Social Services

NOTE:

This is the official treatment protocol of the Ministry of Health and Social Services in Namibia. It is available in every hospital and clinic.

- (ii) Mulder, M. and Nowlan, G.
(Editor)
1987

Practical Guide for General
Nursing
Part 2
Pretoria: Haum

- (iii) Searle, C. and Pera, S., 1992

Professional Practice: A South
African Perspective
Second Edition
Durban: Butterworths

- (c) Practice on manikins or dolls. Ask the coordinator for help.
- (d) Contact L.F. Small at (061) 231616 after 18:00.

9. SELF-EVALUATION

A final evaluation will only be administered at a later date, but to provide you with some guidance to see how you are progressing, self-evaluation questions are provided.

Choose the correct answer. There is only one correct answer. Write only, e.g. 9.1 (d), 9.2 (c), etc.

- 9.1 The circulation of an adult patient is assessed by checking the:
- (a) Radial artery (pulse)
 - (b) Femoral artery (pulse)
 - (c) Carotid artery (pulse)
 - (d) Brachial artery (pulse)
- 9.2 The ratio of compressions to ventilation in a child with one rescuer is:
- (a) 5 compressions, one rescue breath
 - (b) 15 compressions, two rescue breaths
 - (c) 5 compressions, two rescue breaths
 - (d) 15 compressions, five rescue breaths
- 9.3 The depth of the compression on the sternum of an adult is:
- (a) 2 - 3 cm
 - (b) 3 - 5 - 4 cm
 - (c) 4 - 5 cm
 - (d) 5,5 - 7 cm

Indicate whether the following statements are true or false:

- 9.4 The "Heimlich Manoeuvre" is utilized for complete airway obstruction.
1. True
 2. False
- 9.5 The best chance of a successful resuscitation is when basic life support is started within seven (7) minutes.
1. True
 2. False
- 9.6 When a neck injury is suspected, the "jaw thrust" manoeuvre must be used to open the airway.
1. True
 2. False
- 9.7 Mouth-to-nose breathing is used with facial injuries.
1. True
 2. False
- 9.8 Keep the lower limbs flat during cardio-pulmonary resuscitation.
1. True
 2. False
- 9.9 Keep the head and chest horizontal during cardio-pulmonary resuscitation.
1. True
 2. False
- 9.10 When a patient is intubated, there is no need to pause between ventilation and compressions.
1. True
 2. False

- 9.11 Cardio-pulmonary resuscitation should not be interrupted for longer than 30 - 35 seconds.
1. True
 2. False
- 9.12 A child's trachea might close if the neck extension is too vigorous.
1. True
 2. False
- 9.13 Cardio-pulmonary resuscitation should not be initiated in a patient with a limited life expectancy.
1. True
 2. False

10. LIST OF SOURCES

1. Civetta, J.M., Taylor, R.W. & Kirby, R.R. 1988
Critical Care
Philladelphia: J.B. Lippincott Co
2. Kloeck, W.G.J., 1988
Basic Cardio-pulmonary Resuscitation - New Recommendations
Part 1 - Basic Life Support for Adults and Children
Trauma - The Journal of Accident and Emergency Medicine
April/May 1988
3. Ministry of Health and Social Services (no date)
Treatment Manual for Clinics
Windhoek: Ministry of Health and Social Services

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1. INTRODUCTION

Advanced cardiac life support follows basic life support. The core knowledge and skills include the following:

- Airway adjuncts and endotracheal intubation.
- Electrical therapy.
- Arrhythmia recognition and the relevant therapy.
- Cardiovascular pharmacology.
- Initiation of intravenous infusions.
- Myocardial infarction.
- Special resuscitation situations.

2. TARGET GROUP

Registered professional nurses.

3. SUB-DISCIPLINE

Critical care nursing.

4. THEME

Advanced life support.

5. PRE-REQUISITE KNOWLEDGE

General Nursing Science. Before proceeding through this learning package you should have completed the learning package on basic life support.

6. PACKAGE DESCRIPTION

The point of departure are the learning objectives. They indicate the level of

performance.

To reach this performance level, the following outline and activities are recommended:

- Proceed through the outline of the content.
- Additional information can be obtained through instructions in the learning activities.
- Obtain this "additional information" by proceeding through the learning activities.
- Evaluate your own performance by completion of the self-evaluation questions.
- This package must be fully mastered before you proceed to the following packages.

NOTE:

This package does not include a pre- and post-test.
The pre- and post-testing will be done on a separate occasion.

7. OBJECTIVES

On completion of this learning package you should be able to:

- 7.1 Draw a diagram of the heart to indicate the different chambers as well as blood-vessels of the heart.
- 7.2 Explain the electrical conduction through the heart.
- 7.3 Draw an annotated normal E.C.G. pattern.
- 7.4 Draw a diagram to indicate the following blood-vessels:
 - 7.4.1 Basilic vein
 - 7.4.2 Cephalic vein
 - 7.4.3 Median cubital vein

- 7.5 Demonstrate how to initiate an intravenous infusion.
- 7.6 Identify on a diagram the anatomical structures of the upper airway system.
- 7.7 Demonstrate on a manikin how to insert:
 - 7.7.1 Oral airways
 - 7.7.2 Nasal and oral endotracheal intubation (adults and children)
- 7.8 Demonstrate how to operate the different resuscitator bags with airways and with endotracheal tubes.
- 7.9 Demonstrate how to calculate the rhythm on an E.C.G. strip.
- 7.10 Explain what is meant by the term **sinus rhythm**.
- 7.11 Explain the mechanism or meaning of the following dysrhythmias:
 - 7.11.1 Sinus tachycardia
 - 7.11.2 Sinus bradycardia
 - 7.11.3 Ventricular extrasystole
 - 7.11.4 Ventricular tachycardia
 - 7.11.5 Ventricular fibrillation
 - 7.11.6 Asystole
- 7.12 Identify on E.C.G. strips and/or on a monitor, the dysrhythmias mentioned in No. 7.11.
- 7.13 Identify the drugs that you will use for the following dysrhythmias:
 - 7.13.1 Sinus bradycardia
 - 7.13.2 Ventricular extrasystole
 - 7.13.3 Ventricular tachycardia
 - 7.13.4 Ventricular fibrillation
 - 7.13.5 Asystole

- 7.14 Explain the drugs which you have identified in No 7.13 under the following headings:
- 7.14.1 Indication
 - 7.14.2 Mechanism (action)
 - 7.14.3 Dose (adults and children)
 - 7.14.4 Contra-indications
 - 7.14.5 Adverse effects
- 7.15 Explain the use of the defibrillator under the following headings:
- 7.15.1 Indications
 - 7.15.2 Preparation of paddles
 - 7.15.3 Placement of paddles
 - 7.15.4 The setting of the current
 - 7.15.5 The frequency of follow-up defibrillation
- 7.16 Compile a protocol for the treatment of a patient with a myocardial infarction.
- 7.17 Explain what is meant by the following terms:
- 7.17.1 Living Will

NOTE:

Objective no 7.17 is also dealt with in the learning package on **Basic Life Support**.

8. CONTENT

8.1

Content Outline

- Applied anatomy and physiology of the heart
- Selected blood-vessel
- Intravenous infusions
- Applied anatomy of the upper airways
- Airways, endotracheal tubes and the placement of them
- Resuscitator bags
- Selected dysrhythmia and their treatment
- Defibrillator
- Myocardial infarction

8.2

Concepts

- Sinus rhythm
- Sinus tachycardia
- Sinus bradycardia
- Ventricular tachycardia
- Ventricular bradycardia
- Asystolic
- Inotropic
- Chronotropic
- Cardiac output
- Stroke volume

8.3 What is Where?

Advanced Life Support, proceed beyond the ABC of Basic Life Support.

More advanced anatomical, physiological, pharmacological and pathological knowledge is required. Apart from that, advanced skills are also required.

For the relevant anatomy and physiology:

Study:

Tortora, G.J. and
Anagnostakos, N.P.,
1990

Principles of Anatomy and
Physiology

(any edition)

New York: Harper Collins
Publishers

Chapters 20, 21 and 23

Study only material related to
objectives)

Note:

This textbook has been prescribed for general nurses
in Namibia since 1986. It should be readily available.

Content on dysrhythmia may be found in:

Viljoen, M.J. and
Uys, L.R., 1989

General Nursing Medical and
Surgical Textbook

Part 2

Pretoria: Haum

Study:

Chapter 19. Proceed only through the content that is
related to the objectives.

Additional information is included in the package to enhance the content in the
textbook(s).

Helpful hints

1. **Identify the waveforms seen**

Find the QRS. It is usually the largest waveform.

Is there a single P wave in front of each QRS?

Can you identify the T wave following each QRS?

2. **Assess the R to R interval**

Is the R-R: Regular?

Regular except for, eg. early beat?

missed beat?

Irregular?

This is done by measuring the R to R interval, eg. counting the number of small squares, using callipers, or marking 2 or 3 consecutive R waves on a piece of paper and moving the paper along to see if subsequent R waves fall in line. It should be noted that the heart rate is rarely absolutely regular. Both the heart and the lungs have significant vagal innervation that causes the R-R interval to vary by up to 3 small squares, usually with respiration.

3. Calculate the heart rate

Ventricular rate.

Atrial rate (if it differs from the ventricular rate).

There are a number of methods that can be used to calculate the heart rate:

- A. Count the number of cycles in 6 seconds. Multiply this number by 10 to get the number of beats per minute. (Recall: most ECG paper is marked in 3 second intervals.)
- B. Count the number of large squares between R waves and divide this number by 300.
- C. Count the number of small squares between R waves and divide this number by 1500.

4. Measure the PR interval

The PR interval should be assessed for its duration and consistency. Count the number of small squares from the beginning of the P wave to the beginning of the QRS complex and multiply this number by 0.04 seconds. Normal PR = .12 to .20 seconds.

5. Measure the QRS duration

Count the number of small squares from the beginning of the QRS complex to the end of the QRS complex. Multiply this number by 0.04 seconds. Normal QRS = .60 to .10

seconds.

6. **Assess the ST segment**

Is the ST segment iso-electric, elevated, depressed?

7. **Consider the QT interval**

SINUS RHYTHM

Definition

Electrical impulses originate in the S.A. node and spread through the heart in the expected manner.

Characteristic features

1. Normal sequence of wave forms P - QRS - T waves.
2. R to R interval is regular.
3. Rate is 60 - 100 per minute.
4. PR interval is within normal limits.
5. QRS duration is within normal limits.

ARRHYTHMOGENESIS

Arrhythmias occur when there are alterations in impulse formation or impulse conduction.

1. Alterations in impulse formation

- A. Impulses are initiated by the normal pacemaker at a rate that is faster than normal (enhanced automaticity) or slower than normal (depressed

automaticity).

- B. An ectopic focus takes over as pacemaker because its automaticity has been enhanced to rate that is faster than that of the S.A. node.
- C. A latent pacemaker site takes over initiating impulses because the usual pacemaker did not initiate an impulse (escape mechanism,).

2. Alterations in impulse conduction

- A. There may be partial or complete blocks to the conduction of the electrical impulse. These commonly occur at the level of the A-V junction (A-V blocks) or within the ventricles (Bundel Branch Blocks).
- B. Uneven conduction can cause arrhythmias such as extra beats, sustained tachycardias by the mechanism of re-entry.

There are many possible causes for arrhythmias. Common causes include the following:

1. Inadequate myocardial oxygenation

- A. Local ischaemia
- B. Systemic
 - inadequate O₂ available
 - excessive demands for O₂

2. Chemical toxicity

- A. Stress
- B. Drugs
- C. Acid/Base; electrolytes

3. Stretch/Oedema/Scars

Classification of Arrhythmias

Arrhythmias are classified according to site of origin of the impulse and the mechanism

involved.

- Eg.:
- Sinus tachycardia
 - Atrial fibrillation
 - Junctional Escape Rhythm
 - Sinus rhythm with premature ventricular beats

Clinical significance of Arrhythmias

Cardiac arrhythmias are clinically significant because they decrease or have the potential to significantly decrease cardiac output.

1. Acute life-threatening arrhythmias

Cardiac arrest (no pulse).

- 1.1 **Electrical:** Asystole
 - Ventricular tachycardia (pulse less)
 - Ventricular fibrillation
- 1.2 **Mechanical:** EMD Electromechanical Dissociation (normal electrical activity present but no pulse)
 - New Name: Pulseless electrical activity

2. Potential Life-threatening Arrhythmias

Associated with significant symptoms due to decrease in cardiac output

OR

Signify impending cardiac arrest.

2.1 Ventricular Tachyarrhythmias

Decreased cardiac output (rapid ventricular rate, atrial kick) may lead to Ventricular

Fibrillation - V.F.).

2.2 **Supraventricular Tachyarhythmias**

Decreased cardiac output (rapid ventricular rate, no atrial kick).

2.3 **Bradyarrhythmias**

Decreased cardiac output (critically slow ventricular rate). Allows for break through of dangerous tachyarrhythmias.

Assessment of cardiac output is essential for all patients experiencing cardiac arrhythmias. Most important are the following:

Adequate cerebral perfusion

As assessed by the individuals conscious level. Is the individual conscious, alert, oriented or drowsy, perhaps agitated or confused? The individual may feel dizzy if there is a marked decrease in cerebral perfusion. There may be changes in papillary responses to light or in speech patterns.

Adequate coronary perfusion

Marked decrease in perfusion to the heart may be felt by the individual as chest pain. Classically this is described as retrosternal pain that radiates down to the left arm or up to the jaw. However, chest pain may be experienced in many different ways. It may be described as heaviness in the chest, or epigastric discomfort. It may not radiate. Keep in mind that individuals of all ages can be affected in this way by a marked decrease in cardiac output. Myocardial ischaemia may be seen on the ECG as ST changes or T wave changes.

Adequate systemic perfusion

What is the individual's BP? Extremities need to be assessed for colour, temperature, volume of pulses. The urine output is a good indicator of the adequacy of renal perfusion.

No evidence of left ventricular failure

Inadequate perfusion to the heart can rapidly result in L.V. failure. Typically one sees an increase in the respiratory rate, dyspnea and decrease in the SaO_2 . On auscultation crackles or bubbling, gurgling sounds may be heard.

Disturbances in S.A. Node function

SINUS TACHYCARDIA

Definition

The impulse originates in the S.A. node but the rate of impulse formation has increased (enhanced automaticity of the S.A. node).

Characteristic features

1. Normal sequence of waveforms P - QRS - T waves.
2. R to R interval is regular.
3. Rate is greater than 100 per minute, usually up to 150 per minute.
4. PR interval is within normal limits.
5. QRS duration is within normal limits.

Possible causes

1. Sympathetic stimulation

2. Fever
3. Hypovolemia
4. Hypoxemia
5. Heart failure
6. Drugs, etc.

Treatment

Therapy is directed at correcting the underlying causes of the sinus tachycardia.

SINUS BRADYCARDIA

Definition

The impulse originates in the S.A. node, but the rate of impulse formation has decreased (depressed automaticity of the S.A. node).

Characteristic features

1. Normal sequence of waveforms, P - QRS - T waves.
2. R to R interval is regular.
3. Rate is less than 60 per minute, usually not less than 40 per minute.
4. PR interval is within normal limits.
5. QRS duration is within normal limits.

Possible causes

1. Vagal (parasympathetic) stimulation
2. Hypothermia
3. Electrolyte imbalance
4. Drugs, etc.

Treatment

Therapy is directed at correcting the underlying causes of the sinus bradycardia (L.F. Small, 1992: - Lecture notes on dysrhythmias).

NB:

Remember only to concentrate on:

- Sinus rhythm
- Sinus tachycardia
- Sinus bradycardia
- Ventricular extrasystoles
- Ventricular tachycardia
- Ventricular fibrillation
- Asystole

9. LEARNING ACTIVITIES

To enable you to master the objectives, the following learning activities are recommended:

1. Consult the reading list

You will find this reading list with the coordinator. See the cover letter that you have received with the learning package.

2. Study

- | | | |
|-----|---|--|
| 2.1 | Tortora, G.J. and
Anagnostakos, N.P.
1990 | <u>Principles of Anatomy and Physiology</u>
New York: Harper Collins Publishers |
| 2.2 | Viljoen, M.J. and
Uys, L.R., 1989 | <u>General Nursing Medical and Surgical Textbook</u>
Part II
Pretoria: Haum |

Chapter 19 deals with dysrhythmia, including the treatment. The dosages of drugs are **not** included.

3. Practice on manikins and/or dolls. Ask the coordinator for help.
4. Attend post-mortems and ask permission to pass endotracheal tubes.
5. Contact L.F. Small at (061) 231616 after 18:00

10. SELF-EVALUATION

A final evaluation will only be administered at a later date, but to provide you with some guidance to see how you are progressing, self-evaluation questions are provided.

Read through the case studies and answer the questions. There is only one correct answer. Write only 10.1 (b), 10.2 (c).

Mr. F. has been admitted with an acute anterior wall myocardial infarction. He continues to have intermittent chest pain relieved with morphine sulphate 5 mg intravenously. His blood pressure is 130/70 mmHg and his pulse is 110 beats per minute.

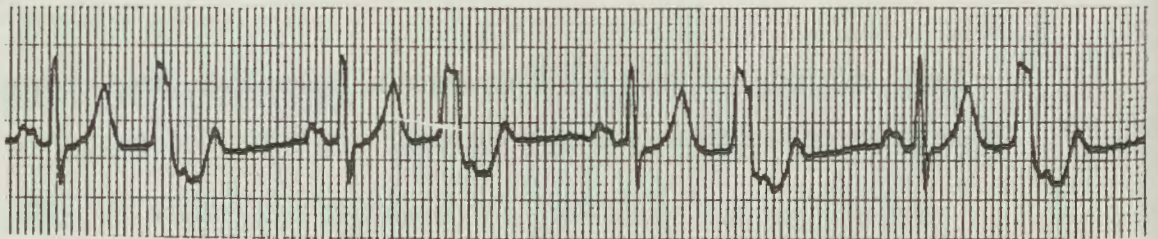
- 10.1 Suddenly, Mr. F. develops ventricular tachycardia. He has not pulse. Your immediate response would be to:
 - (a) Defibrillate with 200 joules
 - (b) Defibrillate with 300 joules
 - (c) Administer lignocaine 100 mg as a bolus
 - (d) Perform a precordial thump
- 10.2 Mr. F.'s rhythm progresses to ventricular fibrillation. After three defibrillation

attempts, which medication should be administered first?

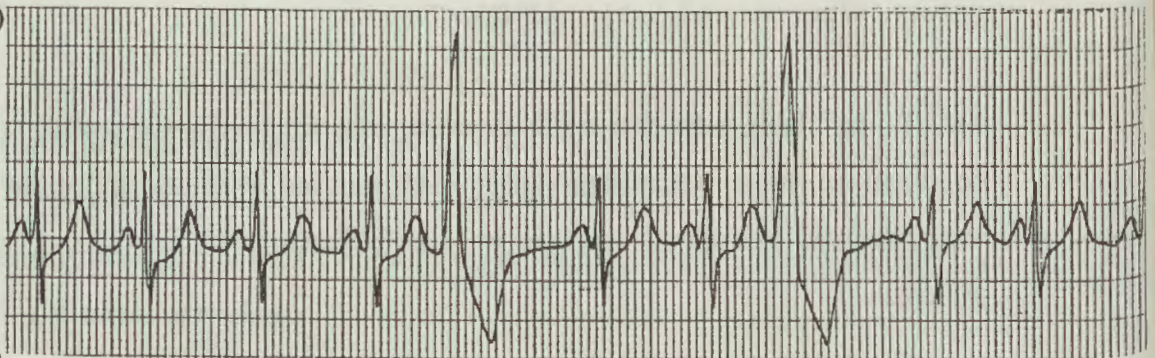
- (a) Sodium bicarbonate
- (b) Adrenaline 1 mg I.V.
- (c) Lignocaine 100 mg I.V. bolus
- (d) Atropine 0,5 mg I.V.

10.3 Identify the following dysrhythmia strips. Also indicate the treatment.

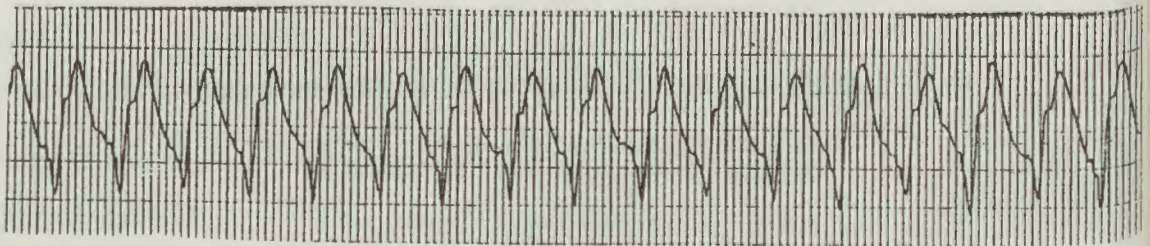
(a)



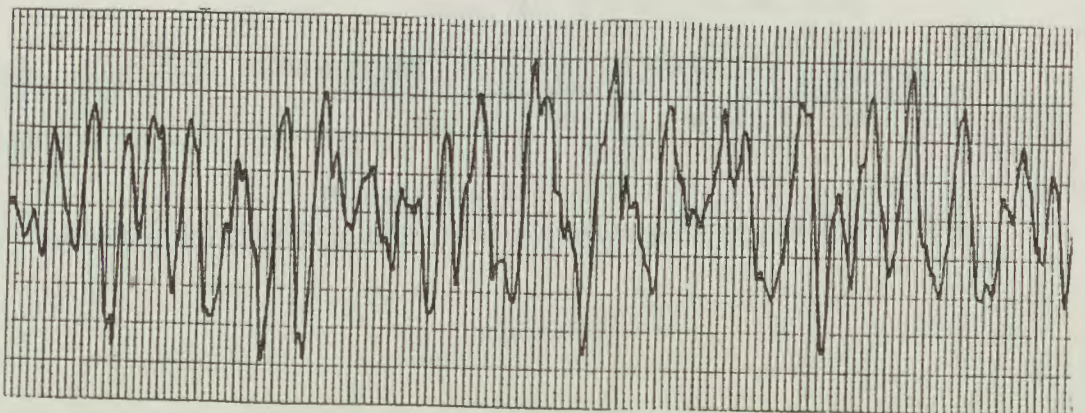
(b)



(c)



(d)



10.4 Match the information in column A with the most appropriate information in column B (Example: 1 (c), 2 (d), 3 (f), etc.).

Column A

1. Positive inotropic
2. Positive chronotropic
3. Positive dromotropic
4. Atropine
5. Lignocaine
6. Calcium chloride
7. Sodium bicarbonate
8. Adrenaline
9. Verapamil (Isoptin)

Column B

- (a) Overdose may lead to convulsions.
- (b) Increase in heart rate.
- (c) Indications are ectopic beats (extrasystole).
- (d) Improvement of heart's contraction.
- (e) Controversial drug - increase myocardial contractility. No longer recommended.
- (f) Improve conduction.
- (g) Overdose may cause hypokalemia, hypernatremia, as well as hyperosmolality.
- (h) One indication is for bradycardia.
- (i) Overdose may lead to excessive vaso-constriction.
- (j) Calcium antagonist.
- (k) $\text{Dose} = 0,3 \times \text{base deficit} \times \text{kg}$.
- (l) Overdose may shift O_2 dissociation curve to left.
- (m) One indication is for supraventricular dysrhythmia - it also causes vasodilation and may be used for patients with angina.
- (n) Overdose may cause delirium, hallucinations, mydriasis and urine retention.
- (o) A powerful catecholamine with

alpha and beta stimulating effects.

- (p) Increase impulse generation and conduction through its vagolytic effects.

11. LIST OF SOURCES

- Tortora, G.J. and Anagnostakos, N.P.,
1990 Principles of Anatomy and Physiology
(Any Edition)
New York: Harper Collins Publishers
- Viljoen, M.J. and Uys, L.R.,
1989 General Nursing Medical and Surgical
Textbook
Part 2
Pretoria: Haum

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SHOCK

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1. INTRODUCTION

Shock is a "multi-disciplinary phenomena". It may manifest in any disease entity as well as in formerly healthy persons. Just think about a competitor in a cross country event who is stung by a bee - the person (who is well and fit) may develop an anaphylactic reaction.

Even though it may "manifest" everywhere, a skilled knowledgeable person is required to recognise it and prevent further deterioration.

2. TARGET GROUP

Registered nurses.

3. SUB-DISCIPLINE

Critical Care Nursing.

4. THEME

Shock.

5. PREREQUISITE KNOWLEDGE

Completion of the following packages:

- Basic Life Support
- Advanced Cardiac Life Support

6. PACKAGE DESCRIPTION

The point of departure is the learning objectives. They indicate the level of performance.

To reach this performance level, the following outline and activities are recommended:

- Proceed through the summary of the content.
- Additional information can be obtained through instructions of the learning activities.
- Obtain this "additional information" by proceeding through the learning activities.
- Evaluate your own performance by completion of the self-evaluation questions.

NOTE:

This package does not include a pre- and post-test. The pre- and post-testing will be done on a separate occasion.

7. OBJECTIVES

On completion of this learning package you should be able to:

7.1 Define the following:

- 7.1.1 Stroke volume
- 7.1.2 Cardiac output
- 7.1.3 Pre-load
- 7.1.4 After-load

7.2 Distinguish between:

- 7.2.1 Intracellular
- 7.2.2 Extracellular
- 7.2.3 Intravascular
- 7.2.4 Interstitial

- 7.3 Identify a formula to be used to determine the vascular (blood) content of adults and children.

- 7.4 Indicate the distribution of fluid between the different compartments (intra, extra, etc.).
- 7.5 Define shock.
- 7.6 **Describe hypovolaemic shock under the following headings:**
- 7.6.1 Aetiology
 - 7.6.2 Signs and symptoms
 - 7.6.3 Laboratory findings
 - 7.6.4 Nursing interventions and medical treatment
- 7.7 **Describe cardiogenic shock under the following headings:**
- 7.7.1 Aetiology
 - 7.7.2 Signs and symptoms
 - 7.7.3 Laboratory findings
 - 7.7.4 Nursing interventions and medical treatment
- 7.8 Explain what is meant by vasogenic shock.
- 7.9 **Describe vasogenic shock under the following headings:**
- 7.9.1 Aetiology
 - 7.9.2 Signs and symptoms
 - 7.9.3 Laboratory findings
 - 7.9.4 Nursing interventions and medical treatment
- 7.10 **Distinguish between the following:**
- 7.10.1 Crystalloid and colloid solutions
 - 7.10.2 Whole blood and packed cells

- 7.11 After assessment, intervene correctly with regard to fluid therapy in the shocked patient.

8. CONTENT

8.1

Content Outline

Definitions:

- Fluid distribution in body
- Hypovolaemic shock
- Cardiogenic shock
- Vasogenic shock
- Blood products

8.2

Concepts

- Cardiac output
- Stroke volume
- Pre-load
- Afterload
- Inotropic agents
- Crystalloid solutions
- Colloid solutions

8.3 What is where?

Certain terminology serves as the basis of shock because they are constantly referred to. Objectives 1 and 2 deals with this terminology.

You will find it in:

Tortora, G.J. and Anagnostakos 1990	<u>Principles of Anatomy and Physiology</u> Sixth edition New York: Harper Collins Publishers
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STUDY:

Chapter 20: - Physiology of cardiac output (CO)
 - Stroke volume

Chapter 27: - Fluid compartments and fluid balance

Look briefly at chapter 19 and only at:

- Physical characteristics of blood

NOTE:

Principles of Anatomy and Physiology by G.J. Tortora and N.P. Anagnostakos has been prescribed since 1986 to all nursing students. It is readily available.

A short summary from Alspach (1991:150-151) on pre-load and afterload is given, which is sufficient.

PRE-LOAD

- Resting force of the myocardium is determined by pressure in ventricles at end of diastole (left ventricular end-diastolic pressure, LVEDP).
- Pre-load can be related to a number of variables (eg. fibre length, stretch, volume).
- Increase in pre-load is accomplished by increasing the volume returning to the ventricles.
- Increase in pre-load stretches myocardial fibres; this event causes more forceful subsequent ventricular contractions, increasing stroke volume and thus cardiac output, but also ventricular work.
- Muscle fibres can reach a point of stretch beyond which contraction is no longer enhanced; stroke volume decreases, leading to heart failure.
- These concepts are known as the Frank-Starling law of the heart.

Factors affecting pre-load

- Mitral insufficiency (increases)
- Mitral stenosis (decreases)
- Aortic insufficiency (increases)

Volume of circulating fluids

- (a) Increased volume increases pre-load
- (b) Decreased volume decreases pre-load

Drugs

- (a) Vasoconstrictors increase pre-load
- (b) Vasodilators decrease pre-load

AFTERLOAD

The initial resistance that must be overcome by the ventricles in order to open the semilunar valves and to propel blood into the systemic and pulmonary circulatory systems.

Factors affecting afterload:

- (i) Aortic valvular stenosis (increases afterload)
- (ii) Peripheral arteriolar vasoconstriction (increases afterload)
- (iii) Hypertension (increases afterload)
- (iv) Polycythemia (increases afterload)
- (v) Drugs
 - (a) Arteriolar vasodilators decreases afterload
 - (b) Arteriolar vasoconstrictors increase afterload

Excessive afterload will increase LV stroke work, decrease stroke volume, increase myocardial oxygen demands, and may result in LV failure.

STUDY:

Ministry of Health and
Social Services
(No date)

Treatment Manual for Clinics
Windhoek: Ministry of Health
and Social Services

NOTE:

All types of shock are explained here as well as the treatment. This is the official treatment protocol of the Ministry of Health and Social Services in Namibia. It is available in every hospital and clinic.

The following textbook has also been prescribed in Namibia for all nursing students - first in Afrikaans and in 1988 in English. It should also be readily available. Some additional information can be found here.

Viljoen, M.J. and
Uys, L.R., 1988

General Nursing
Medical and Surgical Textbook
Part 1
Pretoria: Haum

Study chapter 11:

- Total body fluid
- Shock - classification
- Different types of shock
- Clinical manifestations of shock
- Treatment of shock

9. LEARNING ACTIVITIES

To enable you to master the objectives, the following learning activities are recommended:

1. Reading the reading list

You will find this reading list with the coordinator. See the cover letter that you have received with the learning package.

2. Study

- 2.1 Ministry of Health and Social Treatment Manual for Clinics
Services Windhoek: Ministry of Health and Social
(no date) Services

NOTE:

This is the official treatment protocol of the Ministry of Health and Social Services in Namibia. It is available in every hospital and clinic.

- 2.2 Tortora, G.J. and Principles of Anatomy and Physiology
Anagnostakos, N.P. New York: Harper Collins Publishers
1990

* Chapter 19, 20 and 27. Only the previously identified topics.

- 2.3 Viljoen, M.J. and General Nursing
Uys, L.R., 1988 Medical and Surgical Textbook
Part 1
Pretoria: Haum

* Chapter 11

3. Contact L.F. Small at (061) 231616 after 18:00.

10. SELF-EVALUATION

A final evaluation will only be administered at a later date, but to provide you with some guidance to see how you are progressing, self-evaluation questions are provided.

Read through the different paragraphs, and where applicable, complete the missing words, choose between two (2) given options.

Identify the variables that influence the integrity of the cardiovascular system.

1. _____
2. _____
3. _____
4. _____
5. Blood pressure = cardiac output X _____
6. Cardiac output (C.O.) = stroke volume X _____
7. A shocked patient must be assessed from all parameters:
 - * Rhythm _____
 - * Blood _____
 - * Vascular _____
 - * Muscle _____
8. Shock is a clinical syndrome that occurs as a result of acute _____.
9. The common denominator in all forms of shock is a critical reduction in the supply of _____ to the tissue.
10. Indicate whether the following statements are true/false:
 - 10.1 Whole blood is administered for symptomatic anaemic patients.
 - 10.2 Albumin is indicated for volume expansion.
 - 10.3 The universal blood donor belongs to the law bitre O: Rh negative group

Parts of the evaluation based on: Common sense approach to coronary care by Vincent and Spence (1989:418-422) - see list of sources.

1 INTRODUCTION

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5 **PREVIOUS COURSES**

6 **PACKAGE DESCRIPTION**

7 **OBJECTIVES**

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BURN INJURIES

8.1 **Learning Objectives**

8.2 **Concepts**

8.3 **Work in Progress**

9 **LEARNING ACTIVITIES**

10 **SELF-EVALUATION**

11 **LIST OF SOURCES**

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LEARNING PACKAGE NO.4

BURN INJURIES

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1. INTRODUCTION

Nothing evokes more a feeling of hopelessness on the part of the nurse than taking care of a seriously burnt patient.

To a certain extent this need not always be the case, with knowledge, the necessary skills and a positive attitude, the nurse can make a difference. Of course the nurse's approach to the patient will depend on the extent and depth of the burn injury and factors such as smoke inhalation, damage to internal organs, blunt trauma, or fractures.

In this package, the focus will be on the knowledge, skills and attitude necessary to be an effective care giver to burn patients.

2. TARGET GROUP

Registered nurses.

3. SUB-DISCIPLINE

Critical Care Nursing.

4. THEME

Burn injuries.

5. PRE-REQUISITE KNOWLEDGE

You should have completed the following learning packages before you proceed with burn injuries:

- Basic Life Support
- Advanced Cardiac Life Support
- Shock

6. PACKAGE DESCRIPTION

The point of departure is the objectives. It acts as a guide to the studying of the content. Read through the objectives first and familiarize yourself with them.

The indicated content is supplied to help you to find the answers and obtain the necessary skills and attitudes specified in the objectives.

Prescribed textbooks used by generic (basic) students, are also being referred to. These textbooks are readily available throughout Namibia.

Additionally, the "Treatment Manual for Clinics", issued by the Ministry of Health and Social Services, is also used as a term reference. This manual is available in every clinic and hospital in Namibia.

As a supplement, a reading list is supplied to specified coordinators, who are easily accessible to everyone who uses the learning package.

To enhance your learning, some learning activities are recommended.

NOTE:

This learning package contains no pre- and post-test.
You will be evaluated at a later stage.

However, to help you to judge your own performance, self-evaluation questions are included in this package.

7. OBJECTIVES

On completion of this learning package, you should be able to:

1. Describe the structure of the skin.

2. Explain the functions of the skin.
3. Classify burns according to the depth and severity of tissue injury.
4. Determine the severity of a burn injury. Utilize the following criteria.
 - 4.1 Extent
 - 4.2 Depth of the burn
 - 4.3 Age
 - 4.4 Area involved
 - 4.5 Associated trauma (like fractures, etc.)
 - 4.6 Burn agent
5. Describe the pathophysiology of burn injuries.
6. Explain how you will deal with the following nursing problems (nursing diagnosis):
 - 6.1 Breathing pattern, ineffective, related to constriction, interfering with the mechanics of breathing.
 - 6.2 Fluid volume deficit, intravascular, related to interstitial fluid sequestration secondary to leaky capillary syndrome.
 - 6.3 Tissue perfusion, altered (peripheral), related to major burn.
 - 6.4 Gastrointestinal dysfunction, related to major burn.
 - 6.5 Pain, related to major burn.
 - 6.6 Family processes, altered, related to ill family member.
7. Distinguish between the open and closed methods of treating burn injuries.
8. Explain the rehabilitation approach of the burn injury patient.

8. CONTENT

8.1

Content outline

- Anatomy of the skin
- Physiology of the skin
- Classification of burns
- Evaluation of the severity of burns
- Pathophysiology of burns
- Nursing care
- Rehabilitation

8.2

Concepts

- Rule of Nines
- Baxter Regime
- Escarotomy

8.3 What is where?

* Skin

The skin is one of the larger organs of the body in terms of surface area. The skin is quite complex in structure and performs several functions essential for survival (Tortora, G.J. and Anagnostakos, N.P., 1990:120).

By understanding the anatomy and physiology of the skin, problems encountered during burns will be better understood.

STUDY:

Tortora, G.J. and
Anagnostakos, P.J.
1990

Principles of Anatomy and
Physiology
Sixth Edition
New York: Harper Collins
Publishers

Study chapter 5, the integumentary system and only the physiology and structure of the skin.

This textbook has been prescribed for nursing students in Namibia since 1986, and is readily available.

* **Burns**

A burn is an integumentary injury caused by exposure to a thermal, chemical or electrical source of trauma. The severity of the burn depends on the depth of the tissue burned and the amount of body surface area affected (Holloway, N.M., 1988:267).

For more information on the above and the mastering of objectives three (3) and four (4), study the following:

Viljoen, M.J. and
Uys, L.R.
1987

General Nursing Science
Medical and Surgical Textbook
Part 2
Pretoria: Haum

Study chapter 24. "The nursing care of a patient with burns". Pay special attention to the following:

- Patient assessment
- Lund and Browder's diagram
- Parkland (Baxter) formula

Also for the mastering of objective no. 3 and 4, the following could be studied:

Ministry of Health and Social Services (no date)	<u>Treatment Manual for Clinics</u> Windhoek: Ministry of Health and Social Services
--	--

Chapter 1 deals with **Burns**. Study the following:

- Assessment in Adults and Children

This manual is available in all clinics and hospitals in Namibia.

* **Pathophysiology**

The pathophysiology might be difficult at first. Objective five (5) deals with the pathophysiology.

Additional information apart from the reading list (available at your coordinator) is given here.

This information is summarized from pathophysiological factors associated with burns and burn shock (Kee, 1986:450-452).

Pathophysiology

Explanation

Capillary permeability

A shift of fluid and protein from the intravascular space (vessels) to the burned site. If more than 25 % of the total body surface is burned, fluid (oedema) will accumulate in burned and unburned tissue spaces.

This is known as fluid shift to the third space. The fluid is non-functional, which causes vascular fluid deficit (hypovolemia). This is known as burnt shock.

Most of the fluid shift occurs during the first 12 hours, but could persist for 48 hours post-burn. Approximately

40-50 % of vascular fluid can be lost to burned site and tissue spaces within the first 18 hours.

Serum osmolality Hemoconcentration due to loss of vascular fluid. The serum osmolality is >295 mOsm/L since the proportion of solutes is greater than water.

Circulatory resistance Hypovolemia and decreased blood pressure are sensed by pressoreceptors in the aorta and carotid bodies.

This causes vasoconstriction in order to increase blood flow to the vital organs, i.e. heart, brain and lungs.

Cardiac output With more than 40 % of the total body surface area burned, cardiac output could be decreased 50 % or more due to hypovolemia. Cardiac output = stroke volume x heart rate.

Tachycardia is a compensatory response. Beta receptors in the myocardium increase heart rate.

Hematocrit Elevation of hematocrit due to hemoconcentration from hypovolemia. Anaemia due to blood loss at burned site and haemolysis but it is not assessed until the patient is adequately hydrated.

Haemolysis (destruction of cells) Haemolysis causes a liberation of haemoglobin (free haemoglobin).

Mastering of objectives no. 6, 7 and 8 can best be achieved by studying the reading list available from the coordinator.

The following book also has valuable information on objectives no. 6, 7 and 8:

Viljoen, M.J. and Uys, L.R. 1987	<u>General Nursing Science</u> <u>Medical and Surgical Textbook</u> Part 2 Pretoria: Haum
--	--

Study chapter 24:

- Pulmonary effects
- Gastrointestinal
- Renal
- Rehabilitation

9. LEARNING ACTIVITIES

- Study the reading list and the recommended textbooks. The reading list is available from the coordinator.
- Visit patients with burns (adults and children). Evaluate their fluid and wound treatment.

10. SELF-EVALUATION

There is no pre and post-test included in this learning package. To enable you to judge your own performance, the following self-evaluation questions are included in this package.

Choose the correct answer. There is only one correct answer. Write only 10.1 (b), 10.2 (d). etc.

- 10.1 An estimation of the extent of the burn can be made by using the Rule of Nines. With this Rule of Nines, burns of the chest and abdomen represents:
- (a) 9 %
 - (b) 18 %
 - (c) 36 %
 - (d) None of the above

10.2 Correct statement(s) about a first-degree burn is(are):

1. It involves only partial-thickness damage to the epidermal layer of the skin.
2. It is like a sunburn.
3. There is mild vasodilation and the patient feels chilled.
4. Skin is erythematous and painful.

Your choice:

- (a) 1 + 2 + 3 + 4
- (b) 1 + 2 + 3
- (c) 1 + 3
- (d) 2 + 4

10.3 Correct statement(s) about third degree burns is(are):

1. Partial-thickness.
2. Only the upper portion of dermis is involved.
3. No regenerative epithelial elements are left behind.
4. Characterized by blister formation.

Your choice:

- (a) 1 + 2
- (b) 2 + 3
- (c) 1 + 2 + 3

10.4 Correct statement(s) about third degree burn is(are) as follows:

1. Also known as a full-thickness burn.
2. Subcutaneous tissues also involved.
3. Very few regenerative epithelial elements are left.
4. Very painful.

Your choice:

- (a) 1 + 4
- (b) 1 + 2
- (c) 3 + 4
- (d) 2 + 4

10.5 Correct statement(s) about the Parkland (Baxter) Formula is(are) as follows:

1. It recommends crystalloid replacement at a rate of 4 ml/kg/% of burnt area.
2. It recommends crystalloid replacement only in the first 24 hours at a rate of 4 m/kg/% of burnt area.
3. Half of the replacement must be given in the first 12 hours.
4. Colloids are not given in the first 24 hours.

Your choice:

- (a) 1 + 3 + 4
- (b) 1 + 3
- (c) 2 + 3 + 1
- (d) 2 + 4

Indicate whether the following statements are true or false. Write only 10.6 (T), 10.7 (F), etc.

- 10.6 A second degree burn over $> 25\%$ in an adult body surface area is classified as a major burn.
- 10.7 A third degree burn over 20% body surface area is classified as a major burn.
- 10.8 All inhalation injuries are classified as major injuries.
- 10.9 Care of burn wound is considered only after the stabilization of the patient's condition has taken place.
- 10.10 All patients should have tetanus immunization updated.
- 10.11 Narcotic analgesics should be administered intramuscularly.
- 10.12 Antibiotic use is controversial.

1. INTRODUCTION

2. TARGET GROUP

LEARNING PACKAGE NO. 5

3. SUB-TOPICS

4. THEMES

5. PRE-ASSESSMENT QUESTIONS

6. PACKAGE DESCRIPTION

7. OBJECTIVES

8. CONTENT

CHEST TRAUMA

8.1. Chest trauma

8.2. Causes

8.3. What is a chest?

9. LEARNING ACTIVITIES

10. SELF-EVALUATION

11. LIST OF SOURCES

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1. INTRODUCTION

The thoracic cage serves a "container" for vital organs. The heart and lungs are the most vital organs, however, damage to the aorta and even the oesophagus can be fatal.

The problem with this "container" is that damage here is not that visible or easily recognizable. The patient manifests with certain signs, but you need to be skilled and knowledgeable to prevent sequelae.

In this package, possible problems that may arise within the chest cavity will be highlighted with the rationale that:

- The nurse must be able to identify them
- The nurse must be able to initiate emergency measures for these problems

2. TARGET GROUP

Registered nurses.

3. SUB-DISCIPLINE

Critical Care Nursing.

4. THEME

Chest injuries.

5. PRE-REQUISITE KNOWLEDGE

- General Nursing Science
- Learning package on Basic Life Support
- Learning package on Advanced Cardiac Life Support
- Learning package on Shock

6. PACKAGE DESCRIPTION

The point of departure is the learning objectives. They indicate the level of performance.

To reach this performance level, the following outline and activities are recommended:

- Proceed through the summary of the content
- Additional information can be obtained through instructions of the learning activities
- Obtain this "additional information" by proceeding through the learning activities
- Evaluate your own performance by completion of the self-evaluation questions

NOTE:

This package does not include a pre- and post-test. The pre- and post-testing will be done on a separate occasion.

7. OBJECTIVES

On completion of this learning package, you should be able to:

- 7.1 Distinguish between blunt and penetrating chest wall injuries.
- 7.2 **Define the following:**
 - 7.2.1 Pneumothorax
 - 7.2.2 Tension pneumothorax
 - 7.2.3 Flail chest
 - 7.2.4 Haemothorax
 - 7.2.5 Cardiac tamponade
- 7.3 **Describe the signs and symptoms of the following pathologies:**

7.3.1 Pneumothorax

7.3.2 Tension pneumothorax

7.3.3 Flail chest

7.3.4 Haemothorax

7.3.5 Cardiac tamponade

7.4 Explain the medical treatment and nursing interventions for:

7.4.1 Pneumothorax

7.4.2 Tension pneumothorax

7.4.3 Flail chest

7.4.4 Haemothorax

7.4.5 Cardiac tamponade

7.5 Describe the signs and symptoms of the following:

7.5.1 Rupture of the diaphragm

7.5.2 Contusion to the heart

7.5.3 Rupture of the aorta

7.6 Explain the medical treatment and nursing interventions for:

7.6.1 Rupture of the diaphragm

7.6.2 Contusion to the heart

7.6.3 Rupture of the aorta

8. CONTENT

8.1

Content outline

- Pneumothorax
- Tension pneumothorax
- Flail chest
- Haemothorax
- Cardiac tamponade
- Ruptured diaphragm
- Contusion of heart
- Ruptured aorta

8.2

Concepts

- Cardiac tamponade
- Tracheal deviation
- Mediastinal shift

8.3 What is where?

You will find information on this topic readily available.

Study:

Treatment manual for clinics, p. 62 - 67 (the title follows below).

- Concentrate on signs and symptoms of a flail chest.
- The emergency management of a Tension Pneumothorax is excellently explained.
- The assessment of a penetrating chest wound is presented clearly and understandably.
- A helpful checklist for examining a patient with a chest wound is presented on page 66.
- Familiarize yourself with the emergency treatment on page 67.

SOURCE:

Ministry of Health and
Social Services
(no date)

Treatment Manual for Clinics
Windhoek: Ministry of Health
and Social Services

This manual is available in every clinic and hospital in Namibia.

Another excellent textbook that is available in Namibia is:

Viljoen, M.J. and Uys, L.R. 1987	<u>General Nursing Science</u> <u>Medical and Surgical Textbook</u> Part 2 Pretoria: Haum
--	--

The above-mentioned textbook has been prescribed in Namibia since 1986, and should be easy to consult.

STUDY:

Viljoen and Uys, chapter 18

- The description on rib fractures also has a diagram on palpation of the trachea.
- The management of the following is also described:
 - * Flail chest
 - * Pneumothorax
 - * Haemothorax
 - * Cardiac tamponade

9. LEARNING ACTIVITIES

To help you to master the objectives, the following learning activities are recommended:

1. Read the reading list. This reading list is available at the coordinator. See the cover letter that accompanied the learning package.

2. **Study**

- 2.1 Alspach, J.A. (Editor) Core Curriculum for Critical Care Nurses
1991 Fourth Edition
London: W.B. Saunders Company

This book is optional. It may not be readily available - but coordinators have it in their possession.
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- 2.2 Ministry of Health and Treatment Manual for Clinics
Social Services Windhoek: Ministry of Health and Social
(no date) Services

NOTE:

This is the official treatment protocol of the Ministry of Health and social Services in Namibia. It is available in every hospital and clinic.

It has a concise but informative section on chest trauma on pages 101 - 104.

- 2.3 Viljoen, M.J. and General Nursing Science
 Uys, L.R. Medical and Surgical Textbook
 1987 Part 2
 Pretoria: Haum

3. Contact L.F. Small at (061) 231616 after 18:00.
4. Try to obtain relevant X-rays on which these pathologies are evident. You will often have to rely on your knowledge on the interpretation of X-rays.
5. Try to obtain an E.C.G. diagnostic of myocardial contusion.

10. SELF-EVALUATION

A final evaluation will only be administered at a later date, but to provide you with some guidance to see how you are progressing self-evaluation questions are provided.

Ms. J. is admitted to the ward after a motor vehicle accident in which she was the driver. She was not wearing a seatbelt. On clinical assessment, a diagnosis of flail chest was made.

- 10.1 In a flail chest, which of the following occurs during expiration?
- (a) The affected side becomes depressed.
 - (b) The mediastinum shifts to the unaffected side.
 - (c) The flail portion bulges out.
 - (d) Negative pressure decreases on the affected side.

- 10.2 The physician inserts a chest tube in Ms. J. When correctly placed, the lumen of the chest tube is situated in the:
- (a) Intercostal space
 - (b) Intra-alveolar space
 - (c) Pericardial space
 - (d) Pleural space
- 10.3 Clamping a chest tube may cause:
- (a) Tension pneumothorax
 - (b) Haemorrhage
 - (c) Cardiac tamponade
 - (d) Flail chest
- 10.4 On assessment, which findings would be made on the affected side if the above complication occurred in Ms. J.?
- (a) Patient needs thoracic surgery
 - (b) Chest tube needs repositioning
 - (c) Lung is re-expanding as expected
 - (d) Chest tube needs stripping

Indicate whether the following statements are true or false. Write only 10.5 (T), 10.6 (F), etc.

- 10.5 Flail chest injury may cause a paradoxical motion.
- 1. True
 - 2. False
- 10.6 Never pull a penetrating object, e.g. a piece of steel or wood, out of the chest when giving first aid following chest injury.
- 1. True
 - 2. False

- 10.7 Indications of pneumothorax include dullness on percussion and diminished breath sounds.
1. True
 2. False
- 10.8 Pulmonary function may be inhibited if more than two ribs are fractured.
1. True
 2. False
- 10.9 Cardiac tamponade may manifest itself in a injured patient with symptoms of shock without evidence of external/visible blood loss.
1. True
 2. False
- 10.10 Symptoms of cardiac tamponade include a widened pulse pressure and distant and muffled heart sounds.
1. True
 2. False
- 10.11 Adult Respiratory Distress Syndrome may result from chest injuries.
1. True
 2. False
- 10.12 Laceration of the aorta may occur after deceleration motor vehicle accidents.
1. True
 2. False

11. LIST OF SOURCES

1. Alspach, J.A. (Editor)
1991
Core Curriculum for Critical Care Nursing
Fourth Edition
London: W.B. Saunders Company
2. Ministry of Health and
Social Services
(no date)
Treatment Manual for Clinics
Windhoek: Ministry of Health and Social
Services
3. Viljoen, M.J. and Uys, L.R.
1987
General Nursing Science
Medical and Surgical Textbook
Part 2
Pretoria: Haum

LEARNING PACKAGE NO. 6

**THE IMMEDIATE AND SHORT-TERM
TREATMENT OF HEAD INJURIES**

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1. INTRODUCTION

In the emergency department the nurse is often confronted with head injuries. This might be a problematic issue, because head injuries are difficult to define. The causes are numerous with a variety of manifestations. The manifestations could range from a slight headache to permanent disability and death.

The nurse thus needs guidelines in the assessment, planning, implementing and evaluation of these patients.

This package therefore emphasizes the more important cognitive, affective and psychomotor skills that are required.

2. TARGET GROUP

Registered professional nurses.

3. SUB-DISCIPLINE

Critical Care Nursing.

4. THEME

The immediate and short-term treatment of head injuries.

5. PRE-REQUISITE KNOWLEDGE

- General Nursing Science.
- You should have completed the following learning packages before you proceed with the package on head injuries:
 - * Basic Life Support
 - * Advanced Cardiac Life Support

* Shock

6. PACKAGE DESCRIPTION

The point of departure is the learning objectives. They indicate the level of performance.

To reach this performance level, the following outline and activities are recommended:

- Proceed through the summary of the content.
- Additional information can be obtained through instructions of the learning activities.
- Evaluate your own performance by completion of the self-evaluation questions.
- This package must be fully mastered before you proceed to the next package.

NOTE:

This package does not include a pre- and post-test. The pre- and post-testing will be done on a separate occasion.

7. OBJECTIVES

On completion of this learning package you should be able to:

- 7.1 Draw a diagram to indicate the different lobes of the brain.
- 7.2 Discuss the function of each lobe.
- 7.3 Draw a second diagram of the brain to indicate the position of the meninges.
- 7.4 Indicate on the diagram in No. 7.3 where the following are located:
 - 7.4.1 Epi/Extra-dural bleeding

- 7.4.2 Subdural bleeding
- 7.4.3 Sub-arachnoidal bleeding
- 7.4.4 Intra-cerebral bleeding

- 7.5 Draw a diagram of the circle of Willis.

- 7.6 Describe the formation and circulation of cerebrospinal fluid.

- 7.7 Explain the components of the Glasgow Coma Scale.

- 7.8 Identify the contents that fill the cranium.

- 7.9 Explain with examples where there might be an increase in any of the three (3) contents identified in No. 7.8.

- 7.10 Define increased intra-cranial pressure.

- 7.11 Describe the signs and symptoms of increased intra-cranial pressure.

- 7.12 Describe the treatment of increased intra-cranial pressure.

- 7.13 **Define the following:**
 - 7.13.1 Cerebral concussion
 - 7.13.2 Cerebral contusion
 - 7.13.3 Cerebral laceration

- 7.14 Explain the assessment that you will perform on a person with head injuries.

- 7.15 **Describe a skull base fracture by using the following headings:**
 - 7.15.1 Definition

7.15.2 Aetiology

7.15.3 Signs and symptoms

7.15.4 Treatment

7.16 **Distinguish with regard to definitions, causes, signs and symptoms and treatment between:**

7.16.1 Epi/Extra-dural bleeding

7.16.2 Subdural bleeding

7.16.3 Sub-arachnoidal bleeding

7.17 Distinguish between vasogenic and cytotoxic cerebral edema.

7.18 Explain the criteria for brain death.

8. CONTENT

8.1

Content outline

- Anatomy and physiology of neurological system:
 - * Lobes of brain
 - * Meninges
 - * Blood supply to brain
 - * Formation and circulation of cerebrospinal fluid
- Assessment of head injury patient
- Intra-cranial bleeding
- Increased intra-cranial pressure
- Skull base fracture
- Brain oedema
- Brain death

8.2

Concepts

- Decerebrate rigidity
- Decorticate rigidity
- Lucid period
- Coning
- Cushing reflex
- Brain death

8.3 What is where?

The applicable anatomy and physiology may seem a little overwhelming at first, but if you always refer back to the objectives, and study the indicated chapters and readings, you will soon grasp the essentials.

STUDY:

Tortora, G.J. and Anagnostakos, N.P. 1990	<u>Principles of Anatomy and Physiology</u> Any Edition New York: Harper Collins Publishers
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- Chapter 14
The brain and cranial nerves
- Chapter 21
The circle of Willis is explained here

NOTE:

This textbook has been prescribed since 1986 for nursing students enrolled in the generic (basic) nursing course. It is readily available throughout the country.

A thorough understanding of increased pressure is needed before any trauma of the brain is studied.

This information is found in:

Viljoen, M.J. and Uys, L.R. 1989	<u>General Nursing Science</u> <u>Medical and Surgical Textbook</u> Part 2 Pretoria: Haum
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Chapter 22

- The pathophysiology is explained here
- Treatment is discussed
- The assessment of the neurological patient is explained here - study Table 22.5
- Skull base injuries are explained
- Brain bleeding are explained
- Concussions/contusions are explained
- Brain death is discussed here

The following information is supplied to enhance the information in the two (2) textbooks. The summary is from:

Hickey, J.V. The Clinical Practice of Neurological and Neuro-Surgical Nursing
1986 Second Edition
New York: J.B. Lippincott Company

CLASSIFICATION OF HEAD INJURIES ACCORDING TO LOCATION AND EFFECT ON THE BRAIN

I. By Location

A. Scalp injuries

- (i) Contusion
- (ii) Abrasion
- (iii) Laceration

B. Skull injuries (fractures)

(i) Types of fractures:

- * Linear
- * Comminuted
- * Depressed
- * Compound
- * Basal skull

(ii) Cranial fractures

(iii) Facial fractures

C. Meningeal tears (leakage of cerebrospinal fluid)

- (i) Otorrhea
- (ii) Rhinorrhoea

D. Cerebral injuries

- (i) Concussion
- (ii) Contusion
- (iii) Laceration

(iv) Brain stem injury

E. Intra-cranial haemorrhage

(i) Epidural haematoma

(ii) Subdural haematoma

(iii) Intra-cerebral haematoma

(iv) Sub-arachnoid haemorrhage and intra-ventricular haemorrhage

(v) Injury to blood vessels

II. By Effect

The effect on the brain (area of primary injury) is localized although secondary effects such as hypercapnia and cerebral oedema can lead to a generalized effect on the brain.

A. Focal injury

(i) Contusion/laceration

(ii) Haematoma

(iii) Skull fracture

(iv) Gunshot wounds

B. Diffuse injury

(i) Concussion

* Mild

* Severe

(ii) Diffuse axonal injury (DAI) - the old term is shearing injuries

* Mild

* Moderate

* Severe

9. LEARNING ACTIVITIES

To enable you to master the objectives, the following learning activities are recommended.

9.1 Read the reading list. You will find this reading list with your coordinator. See the cover letter that you have received with the learning package.

9.2 Study

9.2.1 Tortora, G. J. and Principles of Anatomy and Physiology
Anagnostakos, N.P. Any Edition
1990 New York: Harper Collins Publishers

9.2.2 Viljoen, M.J. and General Nursing Science
Uys, L.R. . Medical Surgical Textbook
1989 Part 2: Chapter 22
Pretoria: Haum

9.3 Contact L.F. Small at (061) 231616 after 18:00.

9.4 Attend medical rounds where patients with head injuries are involved.

9.5 Organize a visit to the mortuary to observe a post mortem on a patient with a head injury.

10. SELF-EVALUATION

A final evaluation will only be administered at a later date, but to provide you with some guidance as to see how you are progressing, the following self-evaluation questions are provided.

Choose the correct answer. There is only one correct answer. Write it down on a paper, for example 10.1 (b), 10.2 (a), etc.

First read through the following case study and select the correct answer.

Mr. R., age 25, is admitted to your ward. He is disoriented to time and place. A co-worker reported that Mr. R. had been hit on the head with a beam 3 hours earlier, causing momentary unconsciousness, but appeared fine until an hour ago, when he became tired and "wasn't making any sense". Physical examination detects a dilated non-reactive left pupil. The patient's blood pressure is 160/80 mmHg, his pulse is 80 beats/minute, and his respiratory rate is 16 breaths/minute.

- 10.1 Mr. R.'s history and physical examination suggest which neurologic problem?
- (a) Cerebral concussion
 - (b) Expanding lesion on the right side of the brain
 - (c) Expanding lesion on the left side of the brain
 - (d) Meningeal irritation
- 10.2 Diagnostic studies reveal a temporal fracture with a pineal shift. This finding is typically associated with:
- (a) Subdural haematoma
 - (b) Epidural haematoma
 - (c) Sub-arachnoid haemorrhage
 - (d) Intra-cerebral haemorrhage
- 10.3 The nurse should prepare Mr. R. for which treatment?
- (a) Pharmacologic management
 - (b) Lumbar puncture
 - (c) Surgical evacuation of clot
 - (d) Direct intra-cranial pressure (ICP) monitor

- 10.4 Increased intra-cranial pressure (ICP) is best relieved by:
- (a) Elevating the head of the bed by 30 degrees
 - (b) Providing auditory stimulation to decrease sensory deprivation
 - (c) Increasing oxygenation through postural drainage and suctioning
 - (d) Sedating the patient with morphine sulphate as needed

Mr. J., a 23 year old man who had been weight lifting at a health spa, is admitted to the ward with complaints of a sudden, explosive headache.

- 10.5 The presenting history and symptoms indicate:
- (a) Sub-arachnoid haemorrhage
 - (b) Epidural haematoma
 - (c) Basal skull fracture
 - (d) Brain stem contusion

- 10.6 The parietal lobe is the brain area responsible for:
- (a) Sensory interpretation
 - (b) Speech
 - (c) Vision
 - (d) Emotional responses

Mr. V. is admitted to the ward after a motor vehicle accident in which the right side of his head hit the windshield. A basal skull fracture with right middle meningeal artery damage and a left temporal contusion are detected.

- 10.7 Mr. V. is likely to develop which condition?
- (a) Sub-dural haemorrhage
 - (b) Sub-arachnoid haemorrhage
 - (c) Epidural haematoma
 - (d) Aneurysm

- 10.8 Mr. V. should be assessed for Battle's sign, which is:
- (a) A post-concussion syndrome
 - (b) An ecchymosis over the mastoid bone
 - (c) Black-and-blue discoloration around the eyes
 - (d) A superficial haematoma on the skull
- 10.9 Further assessment may also reveal:
- (a) Otorrhea
 - (b) Meningism
 - (c) Facial paresis
 - (d) Hemianopsia

SOURCES OF SELF-EVALUATION QUESTIONS

Casparis, L. and Noone, J. Critical Care Examination Review
 1990 Second Edition
 Springhouse: Springhouse Corporation

11. BIBLIOGRAPHY

1. Hickey, J.V. The Clinical Practice of Neurological and Neuro-
 1986 surgical Nursing
 Second Edition
 New York: J.B. Lippincott Company
2. Tortora, G.J. and Principles of Anatomy and Physiology
 Anagnostakos, N.P. New York: Harper Collins Publishers
 1990

3. Viljoen, M.J. and General Nursing Science
Uys, L.R. Medical and Surgical Textbook
1989 Part 2
Pretoria: Haum

LEARNING PACKAGE NO. 7

**THE IMMEDIATE AND SHORT TERM
TREATMENT OF SPINAL CORD INJURIES**

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1. INTRODUCTION

Spinal cord injuries may cause permanent disabilities - but it needn't be the case. Quite often it is only an expert person that stands between complete recovery and permanent disability. This expert person in Namibia should be the nurse, because it is the nurse who is often the only "medical" person available in clinics and hospitals. This statement is made with the assumption that the emergency treatment at the scene of the accident was correctly performed.

To be an expert in the management of spinal cord injury requires minimal theoretical knowledge, more psychomotor practising (skills) and abundance of empathy for the needs, fears and expectations of patients.

2. TARGET GROUP

Registered professional nurses.

3. SUB-DISCIPLINE

Critical Care Nursing.

4. THEME

Spinal cord injuries: the immediate and short term treatment.

5. PRE-REQUISITE KNOWLEDGE

- General nursing science
- Learning package on Basic Life Support
- Learning package on Advanced Cardiac Life Support
- Learning package on Shock

6. PACKAGE DESCRIPTION

The point of departure is the learning objectives. They indicate the level of performance.

To reach this performance level, the following outline and activities are recommended:

- Proceed through the summary of the content
- Additional information can be obtained through the instructions of the learning activities
- Obtain this "additional information" by proceeding through the learning activities
- Evaluate your own performance by completion of the self-evaluation questions
- This package must be fully mastered before you proceed to the next packages

NOTE:

This package does not include a pre- and post-test. The pre- and post-testing will be done on a separate occasion.

7. OBJECTIVES

On completion of this learning package you should be able to:

- 7.1 Draw an annotated diagram of a typical vertebrae.
- 7.2 Identify the different vertebrae of the vertebral column.
- 7.3 Identify the termination of the spinal cord.
- 7.4 **Define the following:**
 - 7.4.1 Atlas
 - 7.4.2 Axis
 - 7.4.3 Odontoid/Dens

- 7.4.4 Conus medullaris
- 7.4.5 Cauda equina
- 7.4.6 Filum terminale

- 7.5 Describe the location of the meninges of the spinal cord.

- 7.6 **Describe the nervous supply of the diaphragm under the following headings:**
 - 7.6.1 Name of nerve
 - 7.6.2 Origin
 - 7.6.3 Distribution

- 7.7 Describe the nervous supply of the intercostal muscles.

- 7.8 **Define the following:**
 - 7.8.1 Whiplash injuries
 - 7.8.2 Flexion injuries
 - 7.8.3 Extension injuries
 - 7.8.4 Hangman's fracture
 - 7.8.5 Subluxation
 - 7.8.6 Dislocation

- 7.9 **Distinguish between the following:**
 - 7.9.1 Paraplegia and tetraplegia
 - 7.9.2 Brown séquard syndrome and central cord injury
 - 7.9.3 Spinal shock syndrome and hypovolaemic shock

7.10 Demonstrate your skills in the following:

- 7.10.1 Putting on a neckcollar for a person trapped in a car (simulate it)
 - 7.10.2 Putting on a neckcollar for a person in a recumbent position
 - 7.10.3 The transfer of a patient with a possible neck injury at the scene of the accident onto a stretcher
 - 7.10.4 Logrolling of a patient with a spinal cord injury in any form of neck traction
 - 7.10.5 The lifting of a patient with a neck injury in any form of necktraction
- 7.11 Describe the treatment of a patient with a spinal cord injury after the stabilization of the spinal cord.
- 7.12 Assess a patient's level of injury.

8. CONTENT

8.1

Content outline

- Anatomy of spinal cord
- Diaphragm and inter-costal muscles
- Definitions of trauma to spinal cord
- Complications of trauma to the spinal cord
- Treatment of spinal cord injuries
- Skills in the management of patients with spinal cord injuries

8.2

Concepts

- Whiplash injuries
- Subluxation
- Dislocation
- Hangman's fracture
- Brown séquard syndrome
- Central cord injury
- Spinal shock

8.3 What is where?

The relevant anatomy can be located in:

Tortora, G.J. and Anagnostakos, N.P. 1990	<u>Principles of Anatomy and Physiology</u> Any Edition New York: Harper Collins Publishers
- Study chapter 7: * Typical vertebra, atlas, axis described	
- Study chapter 13: * Anatomy of spinal cord described * Some of the definitions	
- Study chapter 11: * Exhibit 11 - 12 described the muscles of breathing	

NOTE:

This textbook has been prescribed to nursing students since 1986 and is readily available in Namibia.

You will also find information on the emergency treatment of spinal cord injuries in:

Ministry of Health and Social Services (no date)	<u>Treatment Manual for Clinics</u> Windhoek: Ministry of Health and Social Services
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You will find information on the treatment during the acute phase in:

Viljoen, M.J. and Uys, L.R. 1989	<u>General Nursing Science</u> <u>Medical and Surgical Textbook</u> Part 2 Pretoria: Haum
- Chapter 22	

The following information was taken from "The Clinical Practice of Neurological and Neuro-surgical Nursing" by Hickey (1986).

This summary enhances the content of the recommended textbooks.

GENERAL CLASSIFICATION OF INJURIES

Hyper-flexion injuries

- Due to hyper-flexion of the head and neck in acceleration injuries.
- If the posterior ligamental structures are intact, a wedge or compression fracture of the vertebral body is common.
- If the posterior ligamental structures are torn, the facets are usually disengaged and dislocated.

Lateral flexion (rotational injuries)

- Caused by extreme lateral flexion or rotation of the head and neck.
- Characterized by tearing or rupture of the posterior ligamental structures.

Compression injuries

- Caused by axial loading or vertical pressure such as falling from a height and landing on one's feet or buttocks.

NOTE:

It is important in the history-taking to identify the mechanism of injury.

Hyperextension injuries

- Due to hyperextension of the head and neck such as that which occurs in a rear-end vehicle collision.
- Hyperextension injuries tend to cause the greatest amount of injury because backward and downward movement includes a larger arc than flexion.
- A less severe form of a hyperextension injury is called a "whiplash" or an acceleration injury. It is a stress and strain injury to the soft tissue.

Dislocation

When one vertebra overrides another. The supporting ligaments are injured, and the spinal cord may or may not be injured. There is a disruption in the established alignment of the vertebral column that is noted on the X-ray films.

Subluxation

It is a partial or incomplete dislocation of one vertebra over another. There may be cord damage and damage to the supporting ligaments.

Fracture-dislocation

A combined fracture and dislocation. Ligament and cord injury are usually present.

SOME DEFINITIONS

Paraplegia is paralysis of the lower half of the body with the involvement of both legs.

Quadriplegia (tetraplegia) is paralysis involving all four extremities. The term **complete quadriplegia** is used to describe the loss of function of the upper cervical region (above C-6), leaving the patient with no potential for independence. An intact C-6 spinal nerve level is the point of demarcation between permanent dependence and the potential for independence. Intact muscle function of the shoulder rotators, deltoid, biceps, brachioradialis and radial wrist extensors, along with partial strength in the upper pectoral muscle, indicates C-6 function. Although strength in the triceps and hand muscles is lacking, quadriplegics who are described as having mechanical function can generally achieve independence. Therefore, an **incomplete quadriplegic** is one who has loss of cervical spinal function below the C-6 level.

Upper motor neuron lesions are caused by lesions in the corticospinal or corticobulbar tract. Symptoms are spinal shock, sensory and muscle flaccidity. Spasticity develops

after recovery from spinal shock.

In lower motor neuron lesions there is destruction of the anterior horn cells. This manifests in muscle flaccidity, an absent Babinski reflex as well as paresis or paralysis of some muscle groups.

Anterior Cord Syndrome

Due to injury to the anterior part of the spinal cord, which includes the spinothalamic tracts (perception of pain), the corticospinal tracts (perception of temperature), and the anterior grey horn motor neurons.

Manifestation include loss of pain and temperature sensations as well as motor function below the level of the lesion. The sensations of light touch, position and vibration remain intact.

Central Cord Syndrome

Caused by injury and/or oedema to the central cord in the cervical region. The motor deficits are less severe in the lower extremities than in the upper extremities. Sensory deficits vary although the loss is more pronounced in the upper extremities. Varying degrees of bladder and bowel dysfunction are common.

Brown-Séquard Syndrome

Due to a transverse hemisection of the cord whereby half of the cord is transected. It results from a knife or missile injury to half of the cord, a fracture-dislocation of a unilateral articular process, or possibly an acute ruptured intervertebral disc. The term Brown-Séquard Syndrome is generally applied when a relative difference in function is noted from side to side in patients experiencing bilateral cord damage. The signs and symptoms that result are ipsilateral paralysis or paresis, ipsilateral loss of touch, pressure, vibration and position sensation and contralateral loss of pain and temperature.

Horner's Syndrome

Characterized by partial spinal cord transection at T-1 or above. A lesion of either the preganglionic sympathetic trunk or the postganglionic sympathetic nerves of the superior cervical ganglion will result in Horner's Syndrome on the ipsilateral side of the face. The lesion of the sympathetic fibres is due to a partial cord transection in the cervical region.

The manifestations of Horner's Syndrome include the following: the ipsilateral pupil is smaller than the opposite pupil: the ipsilateral eyeball sinks: the affected eyelid droops (ptosis): and the ipsilateral side of the face does not sweat (Hickey, 1986:380-389).

IMMEDIATE RESPONSE TO ACUTE SPINAL CORD INJURY

Spinal shock

Spinal shock is the temporary suppression of reflexes controlled by segments below the level of injury. The normal activity of the spinal cord is dependent on the continual tonic discharge of impulses from the higher centres of the brain.

With acute injury, the input of impulses from these higher centres abruptly stop, resulting in spinal shock. After a period of time (weeks or months) the spinal neurons gradually regain their excitability. At this time the perianal (bulbocavernous) reflex returns. The bulbocavernous reflex is tested by squeezing the glans penis or pulling the catheter and observing for slight muscle contraction.

With digital examination, the anal reflex is present. This is achieved with scratching around the anal region. Muscle contraction may be noted upon the insertion of the rectal thermometer. Weeks may elapse between the appearance of the two reflexes. Acute spinal injury does not always produce complete loss of function so varying degrees of spinal shock are possible (Hickey, 1986:380-389).

9. LEARNING ACTIVITIES

To enable you to master the objectives, the following learning activities are recommended.

9.1 Read the reading list. You will find this reading list with the coordinator. See the cover letter that you have received with the learning packages.

9.2 Study

9.2.1	Ministry of Health and Social Services (no date)	<u>Treatment Manual for Clinics</u> Windhoek: Ministry of Health and Social Services
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Pages 68 - 72.

NOTE:

This is the official treatment protocol of the Ministry of Health and Social Services in Namibia. It is available in every hospital and clinic.

9.3 Practice putting on of neck collars in the emergency department.

9.4 Visit ward with patients that are in neck traction. Practice the lifting and turning of these patients under supervision.

9.5 Contact L.F. Small at (061) 231616 after 18:00
A. Mwoombola at (061) 203-2106/7 (bleep No. 376) during office hours.

10. SELF-EVALUATION

A final evaluation will only be administered at a later date, but to provide you with some guidance as to how you are progressing, self-evaluation questions are provided.

Read through the following case study and then choose the correct answer. There is only one correct answer.

Mr. D. is admitted in your ward after a motor vehicle accident. A C5/C6 lesion is confirmed on X-rays.

- 10.1 You suspect that Mr. D.:
- (a) Has tetraplegia with an intact Triceps and Biceps
 - (b) Has tetraplegia with elementary (gross) arm movements and diaphragmatic breathing
 - (c) Has paraplegia with diaphragmatic breathing
 - (d) Has no muscle movement possibilities
- 10.2 With acute spinal cord injury there would be respiratory paralysis if the injury is above a certain level. What is this level?
- (a) C4
 - (b) C6
 - (c) C7
 - (d) T1
- 10.3 During the first hours after admittance, Mr. D. developed spinal shock with the physical examination, the following signs would have appeared.
- (a) Spasticity
 - (b) Hypertension
 - (c) Tachycardia
 - (d) Areflexia

Discussion questions

- 10.4 Would Mr. D.'s lesion be complete or incomplete within the first 24 hours? Motivate your answer. (5)

- 10.5 Is the lesion of Mr. D. an upper or lower motor neuron lesion?
Motivate your answer. (3)
- 10.6 Describe the complications that could develop in Mr. D. within the first
24 hours. (5)
- 10.7 Explain how you would prevent these complications in Mr. D. (5)
- 10.8 Compile a nursing care plan for Mr. D. for the first 24 hours after
admittance. (10)
- 10.9 Hyper-reflexia:
- (a) Define hyper-reflexia (2)
- (b) Describe the signs and symptoms of the above. (3)
- (c) Explain the treatment of the above. (4)
- (d) What is the prognosis of the above. (11)

11. BIBLIOGRAPHY

1. Hickey, J.V. The Clinical Practice of Neurological and Neuro-
surgical Nursing
1986 Philadelphia: J.B. Lippincott Company
2. Ministry of Health Treatment Manual for Clinics
and Social Services Windhoek: Ministry of Health and Social Services
(no date)
3. Tortora, G.J. and Principles of Anatomy and Physiology
Anagnostakos, N.P. Sixth Edition
1990 New York: Harper Collins Publishers

4. Viljoen, M.J. and
Uys, L.R.
1989
- General Nursing Science
Medical and Surgical Textbook
Part 2
Pretoria: Haum

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SEIZURES

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1. INTRODUCTION

Although the literature abounds with the names of famous persons who have had this affliction, seizures still create a feeling of uneasiness among nurses.

People who have a genetic predisposition are usually treated at home and don't even turn up to an emergency department. It is the seizures which are trauma/drug/metabolic related which cause concern for the nurse. It is the nurse who must ensure that no further damage is caused.

In the case of seizures, knowledge and minimal skills are all that the nurse needs to be competent.

When proceeding through this package, this knowledge and skills requirements will be addressed.

2. TARGET GROUP

Registered nurses.

3. SUBJECT AREA

Critical Care Nursing.

4. THEME

Seizures.

5. PRE-REQUISITE KNOWLEDGE

It is recommended that you have already completed the following learning packages:

- Basic Life Support

- Advanced Cardiac Life Support
- Head Injuries

6. PACKAGE DESCRIPTION

The point of departure is the learning objectives. They indicate the level of performance.

To reach this performance level, the following outline and activities are recommended.

- Proceed through the summary of the content.
- Additional information can be obtained through the instructions of the learning activities.
- Evaluate your own performance by completion of the self-evaluation questions.

NOTE:

This package does not include a pre- and post-test. The pre- and post-testing will be done on a separate occasion.

7. OBJECTIVES

On completion of this learning package you should be able to:

- 7.1 Distinguish with examples between idiopathic and acquired seizures.
- 7.2 Describe the pathophysiology of seizures (very briefly).
- 7.3 **Describe the clinical manifestations of the following epileptic seizures:**
 - 7.3.1 Generalized tonic-clonic seizures (previously called grand mal seizures)
 - 7.3.2 Focal seizures
 - 7.3.3 Jacksonian seizures
 - 7.3.4 Absence seizures
 - 7.3.5 Partial seizures with complex symptoms (psychomotor seizures)

7.3.6 Status epilepticus

7.3.7 Fever convulsions

7.4 Explain how you will maintain an open airway in a patient with an active seizure.

7.5 Explain how you will protect the patient from injury, during a seizure.

7.6 Identify the drugs in the treatment of Status Epilepticus.

7.7 **Explain the following with regard to the identified drugs in Point No. 7.6:**

7.7.1 Mechanism

7.7.2 Dose (dosage)

7.7.3 Adverse effects

7.8 Compile a protocol for your unit for the emergency treatment of a patient with a seizure.

8. CONTENT

8.1

Content outline

- Idiopathic seizures
- Acquired seizures
- Pathophysiology of seizures
- Clinical manifestations of different types of seizures
- Management of open airway in convulsing patient
- Protection of patient from injury
- Drugs in the treatment of Status Epilepticus

8.2

Concepts

- Generalized tonic-clonic seizures (Grand Mal Seizures)
- Focal seizures
- Jacksonian seizures
- Absence seizures
- Partial seizures with complex symptoms (psychomotor seizures)
- Status epilepticus

8.3 **What is where?**

A discussion on epilepsy, the definition thereof, types and treatment can be found in:

Viljoen, M.J. and
Uys, L.R.
1989

General Nursing Science
Medical and Surgical Textbook
Part 2
Pretoria: Haum

Chapter 22

NOTE:

This textbook has been prescribed since 1986 in Namibia, and all nurses should have one in their possession.

STUDY:

Ministry of Health
and Social Services
(no date)

Treatment Manual for Clinics
Windhoek: Ministry of Health and
Social Services

Page 31: Convulsions

Additional information on status epilepticus is supplied to enhance the context of the two recommended textbooks and the reading list.

This summary is taken from:

Van der Merwe, C.
1988

The Management of Emergencies
Pretoria: Kirstenburg Printers
Pages 385-388

STATUS EPILEPTICUS

- Continuous or repeated seizures or when the seizures last so long or recur so frequently that the patient does not recover between seizures.
- The longer the status lasts, the more difficult the control and the poorer the prognosis.
- Brain damage may occur if longer than 60 minutes.
- Without treatment the mortality is 10 - 12 %.

Convulsive status epilepticus

The patient does not regain his normal condition of wakefulness between seizures.

Non-convulsive status epilepticus.

Presents as a prolonged 'twilight' condition, eg. absence status or complex focal status (disturbed consciousness).

Persistent focal attacks

Consciousness is retained throughout, known as 'Epilepsy partialis continuans'.

TREATMENT OF EPILEPTIC EMERGENCIES

In spite of good oxygenation and the correction of metabolic side-effects, irreversible cell damage occurs if the convulsion lasts too long.

NB:

The nurse has to act immediately here: Diazepam I.V.

COMPLICATIONS

- Lactic acidosis

- CO₂ narcosis
- Hyperkalaemia
- Hypotension, hypoglycaemia and shock
- **Cardiopulmonary**
 - * Arrhythmias
 - * Pulmonary oedema
 - * Aspiration pneumonia
- **Renal**
 - * Acute tubular necrosis
 - * Myoglobinuria
- **Autonomic**
 - * Hyperperexia
 - * Vomiting and electrolyte disturbances
 - * Hyper-secretion of sweat, saliva and tracheobronchial mucus

MANAGEMENT

Immediate

- Confirm diagnosis
- Evaluate cardiorespiratory status and administer oxygen
- Obtain blood for:
 - * blood gases
 - * electrolytes
 - * glucose
 - * anti-convulsive drug levels

After 5 - 10 minutes

- Normal saline solution with Vit. BCo IV infusion
- 50 ml of 50 % Dextrose IV as a bolus
- Diazepam IV at a maximum 2 mg/min to total maximum of 18mg/kg.
If hypotension develops the infusion is slowed down.
- Phenytoin IV to a maximum of 50 mg/min to total maximum of 18mg/kg.
If hypotension develops the infusion is slowed down.

After 30 - 40 minutes

- Intubate patient
- Phenobarbital IV or Diazepam maintenance as an infusion or intermittently. Phenobarbital IV to maximum 100 mg/min until convulsions cease or to a total maximum of 20 mg/kg. Diazepam: 50-100 mg normal saline, administered IV at 40 ml/hour. Alternatively, diazepam 5-10 mg IV intermittently.

NOTE:

Concentrate on Diazepam and it's antidote.

9. LEARNING ACTIVITIES

To enable you to master the objectives, the following learning activities are recommended

9.1 Read the reading list. You will find this reading list with the coordinator. See the cover letter that you have received with the learning package.

9.2 Study

9.2.1 Ministry of Health and
Social Services
(no date)

Treatment Manual for Clinics
Windhoek: Ministry of Health and Social
Services

Page 31

9.2.2 Viljoen, M.J. and Uys, L.R.
1989

General Nursing Science
Medical and Surgical Textbook
Pretoria: Haum

Chapter 22

9.3 Contact L.F. Small at (061) 231616 after 18:00.

10. SELF-EVALUATION

A final evaluation will only be administered at a later date, but to provide you with some guidance to see how you are progressing, a self-evaluation is provided.

Read through the following case study and answer the questions. There is only one correct answer. Write only 10.1 (c), 10.2 (b), etc.

Mr. P., a 45 year-old man with a history of seizure disorders, is admitted to your ward after having a seizure 30 minutes earlier. His family states he takes phenytoin (Epanutin) and phenobarbital at home. His vital signs are stable, but he grimaces only in response to tactile stimuli.

10.1 Which statement describes the pathology of seizures:

- (a) The abnormal excessive firing of brain cells causes the clinical signs and symptoms of a seizure
- (b) The entire brain is involved in a seizure
- (c) The metabolism of the involved cells greatly decreased during a seizure
- (d) The abnormal firing of the neurons, once initiated, is perpetuated indefinitely until therapy is instituted.

10.2 Which nursing action has the highest priority for Mr. P. in a postictal state?

- (a) Obtaining a complete history from the family
- (b) Administering 0,9 % normal saline solution intravenously.
- (c) Placing the patient on his side and inserting an I.V. line
- (d) Calling the physician and obtaining a suction apparatus at the bedside

10.3 Mr. P. develops a continuous generalized seizure, and you diagnose status epilepticus. The drug of choice to control status epilepticus is:

- (a) Morphine

- (b) Diazepam
- (c) Phenobarbital
- (d) Pavulon

10.4 Which class of seizures may be manifested by visual, auditory, olfactory hallucinations or a visceral sensation prior to the seizure?

- (a) Complex partial seizures
- (b) Simple partial seizures
- (c) Absence seizures

A continuously convulsing patient with an unknown history is brought to the critical care area of an emergency department.

10.5 Which of the following drugs is most likely to be administered initially?

- (a) Glucose
- (b) Naloxone
- (c) Sodium bicarbonate
- (d) Neostigmine

SOURCES USED FOR SELF-EVALUATION QUESTIONS

1. Hudak, C.M., Callo, B.M. and Benz, J.
1990
Self-study guide for Critical Care Nursing
A Holistic Approach
Fifth Edition
New York: J.B. Lippincott Company
2. Williams, S. and
Alspach, J.
1985
Core Review for Critical Care Nursing
London: W.B. Saunders Company

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DIABETIC KETOACIDOSIS

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1. INTRODUCTION

Nearly all nurses have attended to diabetic patients. All nurses are aware of the constant dangers of hypoglycaemia, but hyperglycaemia is not often encountered in general wards/settings or clinics.

In diabetic ketoacidosis, the problem involves increased blood-sugar levels. Nurses are familiar with tests to determine blood and urine sugar levels which means that with a little bit of guidance, nurses would be able to intervene in a threatening diabetic ketoacidosis.

In this package, the nurse will be guided how to increase her knowledge and skills.

2. TARGET GROUP

Professional nurses.

3. SUBJECT DISCIPLINE

Critical Care Nursing.

4. THEME

Diabetic keto-acidosis.

5. PRE-REQUISITE KNOWLEDGE

- General Nursing.
- It is recommended that you have already studied the packages on:
 - * Basic Life Support
 - * Advanced Cardiac Life Support
 - * Shock

6. PACKAGE DESCRIPTION

The point of departure is the learning objectives. They indicate the level of performance.

To reach this performance level, the following outline and activities are recommended:

- Proceed through the summary of the content
- Additional information can be obtained through the instructions of the learning activities
- Evaluate your own performance by completion of the self-evaluation questions
- This package must be fully mastered before you proceed to the next package

NOTE:

This package does not include a pre- and post-test. The pre- and post-testing will be done on a separate occasion.

7. OBJECTIVES

On completion of this learning package you should be able to:

- 7.1 Explain the functions of insulin.
- 7.2 Indicate the normal blood glucose level.
- 7.3 **Define the following:**
 - 7.3.1 Gluconeogenesis
 - 7.3.2 Glycogen
 - 7.3.3 Glycolysis

7.4 Explain the effect that the following hormones/drugs/conditions will have on the blood-glucose level:

7.4.1 Adrenaline

7.4.2 Glucocorticoid

7.4.3 Insulin

7.4.4 Glucagon

7.4.5 Growth hormone

7.4.6 Stress

7.4.7 Trauma

7.5 Describe the pathophysiology of diabetic ketoacidosis (DKA).

7.6 Enumerate the aetiology or precipitating factors of diabetic ketoacidosis.

7.7 Describe what you might find during the nursing assessment of a patient with diabetic ketoacidosis with regard to:

7.7.1 Nursing history

7.7.2 Nursing examination of the patient:

(a) Inspection

(b) Blood pressure and pulse

(c) Respiration

7.7.3 Laboratory values

7.8 Describe the treatment of a patient with diabetic ketoacidosis (DKA). Utilize the following nursing diagnosis:

7.8.1 Fluid volume deficit related to osmotic diuresis induced by hyperglycaemia.

7.8.2 Altered nutrition, less than body requirements, related to catabolic effects of insulin deficiency and stress hormone excess.

7.8.3 Acid-base imbalances related to accumulation of keto-acids secondary to

insulin deficiency and stress hormones excess.

- 7.8.4 Potential hypoglycaemia related to insulin therapy and a decrease in circulating insulin - antagonistic hormones.

8. CONTENT

8.1

Content outline

- Functions of insulin
- Definitions
- Hormonal effects on blood glucose level
- Pathophysiology of diabetic ketoacidosis
- Aetiology of diabetic ketoacidosis
- Assessment of a patient with diabetic ketoacidosis
- Treatment of a patient with diabetic ketoacidosis

8.2

Concepts

- Gluconeogenesis
- Glycogen
- Glycolysis
- Acidosis
- Osmotic diuresis

8.3 What is where?

Information on the functions of insulin, definitions and hormonal effects on blood glucose level could be found in:

Tortora, G.J. and Anagnostakos, N.P. 1990 (or any year)	<u>Principles of Anatomy and Physiology</u> Sixth Edition New York: Harper Collins Publishers
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- Chapter 18:
 - * Functions of insulin
 - * Hormonal effects on blood glucose level
- Chapter 25:
 - * Definitions - read the paragraph that deals with the physiology of carbohydrate metabolism

NOTE:

This textbook has been prescribed since 1986 in Namibia for General Nursing students. It should be readily available.

Additional information is supplied to enhance the content of the two (2) recommended textbooks.

The information is adapted from: Van der Merwe, C.: The Management of Emergencies (see Bibliography).

PATHOPHYSIOLOGY OF DIABETIC KETO-ACIDOSIS

The pathophysiological changes include:

1. Metabolic disturbances in glucose and lipid metabolism.
2. Water and electrolyte disturbances:
Deficits in water, sodium, potassium, phosphate and magnesium.
3. Glucose metabolism disturbances:
Characterised by hyperglycaemia, hyperosmolality, glycosuria, osmotic diuresis and dehydration. As a result of reduced insulin, lipids and lipid reserves are mobilized and transformed into fatty acids. Fatty acid oxidation to ketone bodies takes place in the liver. This causes ketonaemia and ketonuria. This leads to: hyperlipidaemia, ketonaemia, metabolic acidosis.

WATER AND ELECTROLYTE DISTURBANCES

1. Water loss may be up to 6 litres.
2. Sodium deficit of 300-500 mmol. Plasma Na concentration can be high, low or normal.
3. Nett potassium deficit of 300-400 mmol, due to renal losses. Plasma potassium is often high as a result of:
 - Catabolism of protein and glycogen
 - Haemoconcentration as a result of dehydration
4. Phosphate: 2,3 DPG of red blood cells is reduced (50-70 mmol/kg).
5. Magnesium deficit.

NOTE:

Hypokalemia is a dangerous situation which can cause ventricular fibrillation.

MANAGEMENT**1. Fluid administration**

Begin with ½ strength saline solution: first litre within 30 minutes, second litre within the next hour, third litre over following 2 hours, 5 % dextrose as soon as the blood sugar value falls to 14 mmol/l.

Begin with full strength (0,9 %) NaCl and use ½ strength (0,45 %) NaCl only after the sodium plasma level rises above 155 mmol.

2. Insulin administration (2 methods)**Intramuscular method:**

Administration: 20 U IM crystal insulin. Then 5 U per hour. If there is no improvement with 2 hours - follow with IV insulin. The initial dose is crystal insulin 100 U, ½ IV, ½ IM. Thereafter 50 U every 1½ hours depending on the serum glucose.

Micro-intravenous administration of insulin: Constant infusion of 5 U crystal insulin/hour.

Method:

- Bolus administration 10 U crystal insulin.
- Piggy back infusion of 500 ml saline solution with 40 U crystal insulin added (do not add to rehydration fluid). Administration at 1 ml/minute. Discontinue infusion as soon as the blood sugar drops to 14 mmol/L and follow up with a 5 % dextrose and water infusion.

Administer 10 U insulin IM half an hour before ceasing infusion to achieve overlapping cover. The dosage can be increased if improvement in the serum glucose is not apparent within 2 hours.

3. Potassium administration

- Potassium chloride is added as soon as insulin administration has been commenced.
- Begin with 13 mmol/hour.
- Determine potassium value. If it rises $K > 5,5$ mmol/L - discontinue administration. If it drops $K < 4$ mmol/L, 26 mmol/hour is administered. An even higher potassium dosage can be administered if required. If the serum potassium value is 3 mmol or less, 39 mmol/hour is administered.

Some physicians first wait for the serum potassium result before administering. Others wait until urinary excretion has begun. The administration of sodium bicarbonate is not routinely indicated, even if the patient is by definition acidotic with a $pH < 7,4$.

NOTE:

Potassium administration should always be administered with caution!

4. Administration of sodium bicarbonate

- Dosage:**
- $pH < 7,1$: administer 50 mmol $NaHCO_3$ + 13 mmol potassium within 30 minutes
 - $pH < 7,0$: administer 100 mmol $NaHCO_3$ + 25 mmol potassium within 45 minutes. Determine pH and base deficit every 30 minutes. Sodium bicarbonate administration is repeated according to the pH.

9. LEARNING ACTIVITIES

- 9.1 Read the reading list (reading list for Learning Package No. 9). You will find

this reading list with the coordinator. See the cover letter that you have received with the learning package.

9.2 Study

9.2.1 Tortora, G.J. and Principles of Anatomy and Physiology
Anagnostakos, N.P. Sixth Edition
1990 New York: Harper Collins Publishers

9.2.2 Viljoen, M.J. and General Nursing Science
Uys, L.R. Medical and Surgical Textbook
1989 Part 2
Pretoria: Haum

9.3 Visit diabetic patients in the wards. Compare their insulin dosages with blood sugar results and urine glucose levels.

9.4 Contact L.F. Small at (061) 231616 after 18:00.

10. SELF-EVALUATION

A final evaluation will only be administered at a later date, but to provide you with some guidance as to see how you are progressing, self-evaluation questions are provided.

Select the correct answer. There is only one correct answer. Write only 10.1 (c), 10.2 (a), etc.

10.1 Diabetic ketoacidosis (DKA) occurs as a result of:

- (a) Insulin overdose
- (b) Insulin deficiency
- (c) Increased tissue glucose

- (d) Insulin releasing factor deficiency
- 10.2 Gluconeogenesis is the formation of glucose from:
- (a) Carbohydrates
 - (b) Non-carbohydrate sources
 - (c) Glycogen
 - (d) Vitamins
- 10.3 In diabetic ketoacidosis (DKA), the energy for gluconeogenesis is supplied primarily by:
- (a) Breakdown of amino acids
 - (b) Release of hepatic enzymes
 - (c) Circulating glucose
 - (d) Oxidation of fatty acids
- 10.4 Insulin therapy for diabetic ketoacidosis results in which of the following changes?
- (a) Increased cellular potassium
 - (b) Decreased cellular potassium
 - (c) Increased serum glucose
 - (d) Increased serum potassium
- 10.5 Factors that may precipitate diabetic ketoacidosis include:
- (a) Weight reduction
 - (b) Exercise
 - (c) Stress
 - (d) Low carbohydrate diet
- 10.6 On admission, a patient was noted to have regular respirations of increased rate and depth. Which respiratory pattern does this finding describe?
- (a) Kussmaul's respirations
 - (b) Cheyins-stokes respirations

- (c) Biot's respirations
 - (d) Paradoxical respirations
- 10.7 Dehydration in diabetic ketoacidosis results primarily from:
- (a) ADH deficiency
 - (b) Decreased medullary blood flow
 - (c) Osmotic diuresis
 - (d) Diminished oral intake
- 10.8 Signs of diabetic ketoacidosis the nurse should recognise include:
- (a) Cool, clammy skin
 - (b) Presence of Babinski reflex
 - (c) Shallow, rapid respirations
 - (d) Excessive thirst

Sources utilized for the above-mentioned questions:

Williams, S. and Alspach, J. 1985	<u>Core Review for Critical Care Nursing</u> W.B. Saunders Company: London
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11. BIBLIOGRAPHY

- 11.1 Tortora, G.J. and Anagnostakos, N.P.
1990 (or any other edition)
- Principles of Anatomy and Physiology
Sixth Edition
New York: Harper Collins Publishers
- 11.3 Viljoen, M.J. and Uys, L.R.
1989
- General Nursing Science
Medical and Surgical Textbook
Part 2
Pretoria: Haum

- 11.4 Williams, S. and Alspach, J.G.
1985 Core Review for Critical Care Nursing
London: W.B. Saunders Company
- 11.5 Van der Merwe, C.
1988 The Management of Emergencies
Pretoria: Kirstenburg Printers

1 INTRODUCTION

2 TARGET GROUP

3 SUBJECT **LEARNING PACKAGE NO. 10**

4 THEME

5 THE NURSE'S KNOWLEDGE

6 PACKAGE DESCRIPTION

7 OBJECTIVES

8 CONTENT

RECOVERY ROOM NURSING

9 Course Objectives

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1. INTRODUCTION

The post-operative period is probably the most vulnerable period for a patient. During this period both the central nervous system and the respiratory centre may be depressed. There is also the possibility of dysrhythmias due to the action of certain anaesthetics, while fluid disturbances with bleeding and hypotensive shock are also complications which should be kept in mind.

To act as the "guardian" of the patient, certain requirements are necessary such as:

- An informed competent nurse
- A "suitable" environment

The package will elaborate on the term "suitable" environment. To be informed and competent means:

- To predict possible complications, to identify them if they should occur and to implement suitable nursing interventions.
- To identify ethical and legal implications and respond in accordance with them. This package thus strives to prepare a competent person.

2. TARGET GROUP

Registered professional nurses.

3. SUBDISCIPLINE

Critical Care Nursing.

4. THEME

Recovery room nursing.

5. PRE-REQUISITE KNOWLEDGE

- General Nursing Science
- You should also have completed the learning packages on:
 - * Basic Life Support
 - * Advanced Cardiac Life Support
 - * Shock
 - * The immediate and short term treatment of head injuries
 - * The immediate and short term treatment of spinal cord injuries
 - * Seizures
 - * Chest trauma
 - * Diabetic keto-acidosis

6. PACKAGE DESCRIPTION

The point of departure is the learning objectives. They indicate the level of performance.

To reach this performance level, the following outline and activities are recommended:

- Proceed through the summary of the content.
- Additional information can be obtained through instructions of the learning activities.
- Evaluate your own performance by completion of the self-evaluation questions.

NOTE:

This package does not include a pre- and post-test. The pre- and post-testing will be done on a separate occasion.

7. OBJECTIVES

On completion of this learning package you should be able to:

7.1 **Discuss the guidelines for the care of patients recovering from anaesthesia as compiled by the South African Society of Anaesthetist under the following headings:**

7.1.1 General principles as discussed in this document

7.1.2 Structural requirements of the recovery room

7.1.3 Equipment necessary for a recovery room

7.2 **Demonstrate your skills in advanced life support with regard to:**

7.2.1 Defibrillation (covered in package on "Advanced Cardiac Life Support")

7.2.2 Explanation when the following drugs should be administered:

(a) Adrenaline

(b) Dopamine

(c) Dobutamine

(d) Lignocaine

(e) Atropine

7.2.3 Intubation

NOTE:

Objective No 7.2 was dealt with in the learning package on "Advanced Cardiac Life Support".

7.3 **Distinguish between the following:**

7.3.1 Narcotic and non-narcotic analgesia

7.3.2 General and regional anaesthesia

7.3.3 Depolarizing and non-depolarizing muscle relaxants

7.4 Identify the antidote for opiates.

7.5 Identify the medicines that are used to counteract non-depolarizing muscle

relaxants.

7.6 Describe the nursing assessment to be done of the following systems:

- 7.6.1 Respiratory system
- 7.6.2 Cardiovascular system
- 7.6.3 Central nervous system
- 7.6.4 Renal system
- 7.6.5 Gastrointestinal system

7.7 Explain the causes of the following post-operative complications:

- 7.7.1 Hypothermia
- 7.7.2 Hyperthermia

7.8 Discuss the relevant legal aspect of concern in the recovery room.

7.9 Discuss the relevant ethical issues of concern in the recovery room.

8. CONTENT

8.1

Content outline

- Guidelines for practice by the South African Society of Anaesthetists
- Skills with regard to advanced life support like:
 - * Defibrillation
 - * Drugs usage such as:
 - ** Adrenaline
 - ** Dopamine
 - ** Dobutamine
 - ** Lignocaine
 - ** Atropine
 - * Intubation
- Narcotic and non-narcotic analgesics
- General and spinal anaesthesia
- Depolarizing and non-depolarizing muscle relaxants
- Nursing assessment
- Hypo- and hyperthermia as post-operative complications
- Legal aspects
- Ethical aspects

8.2

Concepts

- Depolarizing and non-depolarizing
- Narcotic and non-narcotic analgesics

8.3 **What is where?**

The document from the South African Society of Anaesthetists is included in this package. Information which affects objective No. 1 could be found in this document.

STUDY:

Viljoen, M.J. and
Uys, L.R.
1988 (or latest
edition)

General Nursing Science
Medical and Surgical Textbook
Part 1
Pretoria: Haum

Chapter 7:

- Information with regard to objective No. 7.3 could be found here.

NOTE:

This textbook has been prescribed for general nursing students and should be readily available.

Additional information is supplied here. It is taken from:

Alsopach, J.G. (Editor)
1991

Core Curriculum for Critical Care Nursing
London: W.B. Saunders Company

Information with regard to objectives No. 7.4 and No. 7.6 could be found here.

Completion of the remaining objectives may be achieved through the reading list and learning activities - see learning activities.

RECOVERY FROM ANAESTHESIA

1. **Pathophysiology:** depends on pre-operative condition, type of surgery,

anaesthetic agent(s) used, duration of anaesthesia and intra-operative course.

2. **Clinical presentation:**

- (a) Absent reflexes due to deep anaesthesia
- (b) Depressed respiration and circulation due to deep anaesthesia
- (c) Cough reflexes return first
- (d) Vomiting and swallow reflexes return next
- (e) Then consciousness returns
- (f) Some patients have a period of excitement. This is potentiated by pre-operative administration of scopolamine, phenothiazine and barbiturates without narcotics

3. **Impact on nursing process**

(a) **Assessment**

- (i) Pre-operative assessment of physical and psychologic status of patient will provide baseline post-operatively.
- (ii) Anaesthesiologist/surgeon should report the following information to the nurse:
 - Patient's name, age, native language
 - Surgical procedure, length of surgery, name of surgeon
 - Pre-operative medications and anaesthetic agent(s) used
 - Previous medical history, including medications, allergies, mental status, communication handicaps
 - Intra-operative course including vital signs, medications, dysrhythmias, estimated blood loss and replacement
 - Monitoring required, problems anticipated from anaesthesia, and/or surgical procedure
- (iii) Initial assessment should be carried out by anaesthesiologist and nurse on admission to recovery room or ICU.

- (iv) All body systems, with particular attention to respiratory, cardiovascular and nervous systems, should be assessed at frequent intervals until effects of anaesthesia are reversed.
- (v) Signs of complications should be sought.

(b) **Planning**

- (i) Recovery from anaesthetic agents will be complete.
- (ii) Assess patient for signs of systemic complications and sequelae.

c. **Implementation**

- (i) Different anaesthetic agents have different durations of action.
 - Assess arousability by calling patient's name
 - Assess gag, swallow reflexes
 - Assess for reversal of neuromuscular blockade
 - * Ability to sustain head lifting, eye opening, hand grasp
 - * Ability to extrude tongue for 5-10 seconds
 - * Vital capacity of 10-15 ml/kg and respiratory force of -25 cmH₂O
 - * Neostigmine or pyridostigmine may be given to hasten reversal
 - Naloxone is given to reverse respiratory depression of opiates.
 - * Along with reversal of respiratory depression with naloxone comes pain, coughing and agitation
 - * Patients who are intubated with respiratory support may be allowed to recover from effects of narcotics without reversal

NOTE:

Concentrate on points C, the implementation
- to determine reversal of anaesthesia

(ii) Continuous monitoring for systemic complications

- Respiratory

- * Measurements of ventilation
- * Rate, rhythm, use of accessory muscles
- * Breath sounds, adventitious sounds
- * ABG's

NOTE:

Pay also attention to muscle relaxants and how to counter-act them

- Cardiovascular

- * ECG - rate, rhythm, conduction
- * Blood pressure
- * Peripheral circulation
- * Heart sounds

- Central nervous system

- * Level of consciousness
- * Protective reflexes, pupillary reflexes
- * Motor ability
- * Tests for neuromuscular blockade may be increased by hypothermia, hyper-magnesemia, hyper-calcemia, inhalation anaesthetic agents, almost all antibiotics, furosemide and renal failure.

NOTE:

Pay attention to muscle relaxants.

- Temperature

- * Hypothermia may be caused by cold environments, obtundation of thermoregulatory centres, and vasodilatation
- * Hyperthermia may be caused by infection or reaction to anaesthetic

NOTE:

Objective 7.7

- Renal
 - * Fluid balance
 - * Electrolytes
 - * Creatinine, urea
- Gastrointestinal
 - * Nausea and vomiting may be caused by any anaesthetic agents
 - * Aspiration most common complication
 - * Opiates stimulate vomiting reflex
- Pain - should be controlled with opiates if severe
 - * May cause nausea if used alone
 - * Monitor patient for respiratory, cardiovascular depression
 - * Titrate dose to patient response

NOTE:

Remember the antidote

- * Barbiturates and phenothiazine drugs should not be used alone, i.e. without an analgesic, in patients who are in pain. Barbiturates and phenothiazine cause increased sensitivity to pain, and restlessness.

(d) Evaluation

- (i) Patient returns to pre-operative status after anaesthesia.
- (ii) Systemic complications and sequelae will be prevented and/or treated.

9. LEARNING ACTIVITIES

To enable you to master the objectives, the following learning activities are recommended:

9.1 Read the reading list for Learning Package No. 10. You will find this reading list with your coordinator. See the cover letter that you have received with the learning package.

9.2 Study

Viljoen, M.J. and	<u>General Nursing Science</u>
Uys, L.R.	<u>Medical and Surgical Textbook</u>
1988 (or latest edition)	Pretoria: Haum

Chapter 7

9.3 Visit the recovery room of your hospital. Evaluate whether it adheres to the guidelines as stipulated by the South African Society of Anaesthetists.

9.4 Contact L.F. Small at (061) 231616 after 18:00.

10. SELF-EVALUATION

A final evaluation will only be administered at a later date, but to provide you with some guidance as to see how you are progressing, self-evaluation questions are provided.

10.1 Indicate whether the following statements are true or false. Write only on paper "T" or "F":

10.1.1 Acute vasodilatation is a complication of spinal anaesthesia.

10.1.2 With spinal anaesthesia the spinal nerve is blocked in the epidural space.

10.1.3 Headaches may develop after a spinal anaesthesia due to leakage of cerebrospinal fluid.

10.1.4 Scholine is an example of a non-depolarizing muscle relaxant.

10.1.5 Pancuronium (Pavulon) is an example of a depolarizing muscle relaxant.

10.2 Identify the correct answer. There is only one correct answer. Write only 10.2.1. (b), 10.2.2 (e), etc.

10.2.1 Which of the following functions would return first when the patient is recovering from anaesthesia?

- (a) Swallowing reflex
- (b) Consciousness
- (c) Vomiting reflex
- (d) Coughing reflex

10.2.2 The success of the counteracting of muscle relaxants can be evaluated by all except:

- (a) Hand grasp (strength)
- (b) Ability to extrude tongue
- (c) Vital capacity
- (d) Heart rhythm

11. BIBLIOGRAPHY

- 11.1 Alspach, J.G. Core Curriculum for Critical Care Nursing
1991 London: W.B. Saunders Company

