

CHAPTER 1

INTRODUCTION

1.1 Rationale

The access to and quality of emergency services is an important aspect in health service provision and it is one of the important indicators of the quality of the health system. When there is a quality service, it can change the outcome of patients from bad to good, provided it is easy to access and the facility well equipped with personnel and other resources.

For the adequate planning and management of the system, in order to render the effective and smooth running of an Emergency Department (ED), it is, therefore, of paramount importance to know who is using the service, and how it is used.

In the researcher's experience, whilst working in the public sector it was seen that many Emergency Department (ED) visits are non-urgent, and occur for different reasons. Some patients are more likely to use the ED because at the clinics, they do not have a doctor to assess their problems, or it might be convenient, especially at night, due to shorter waiting times, because of the 24-hours service.

Others might think that their visits are appropriate despite not having an acute medical or surgical problem. It is possible that a triage or other tools can provide some elements to evaluate the appropriateness of these visits.

An understanding of patient perceptions and the pattern of the use of the ED will provide an insight into the need for the service, as well as facilitate the planning of the necessary resources.

1.2 Aim

The aim of this study is to determine the factors contributing to the pattern of attendance of patients at the Emergency Department of the district hospital in Carletonville.

1.2 Objectives

- To determine the patient's socio-demographic variables such as gender, age, employment status and place of residence.
- To classify patients according to their clinical problems: Medical, Surgical/trauma, Paediatrics, Obstetric and Gynaecology and Psychiatric.
- To determine the factors related to the use of the Emergency Department:
 - a) Factors related to patients
 - b) Factors related to the system
- To correlate variables and to explain the possible associations.

CHAPTER 2

LITERATURE REVIEW

2.1. Introduction

The ED is a key point for patient's encounters in any hospital, and its correct utilisation by patients as well as appropriate staffing and equipping will make that experience a success or a reason for complaints. On the other hand, the use of the ED by non-emergency patients, for whatever reason, can create a burden for the personnel, distract their attention from real emergencies with adverse outcomes, and very important cost implications for the institution.¹

The global problem of overcrowding of the ED is mentioned in many research studies, with particular emphasis on the impact for the service and the institution. This situation of overcrowding is not confined to the ED, but also causes an overflow of other wards in the hospital, and so spreads its effect even wider.²

Therefore, it is important to know what type of population uses the ED in terms of their demographic data (age, gender, employment status, and other demographics), what their most common medical problems are, and the reasons for using the service in a particular place or time. Knowing these elements will provide grounds for planning resources and organizing services according to the needs of the community.

The findings of research into ED use worldwide can be divided broadly into two groups: those that have found patients use the ED service properly and others who found that attendance was not justified. Unfortunately, there is no single tool or triage system that can unequivocally say who is right to access the ED or not; and consequently divert the patient without the risk of a possibly compromised outcome.

The situation of the use of the ED in South Africa is not broadly known, as the search for published studies on this topic revealed very few results, some of them oriented to specific issues of medical domains within the ED, like trauma in children. Three research studies regarding this topic were found in the South African Journal of General Practice (SAJFP).^{3, 4, 5}

The first one was done by Le Roux et al, in the ED at the National Hospital in Bloemfontein, regarding the appropriateness for the attendance at the ED. The second one was carried out by Pontso et al in the same hospital; but in a different year and was about the injuries in children. The third was a study done by Nkombula in the ED of Middleburg Hospital, Mpumalanga province.

It is therefore important to have new published research in the field that can provide insight into the current situation in South Africa. There are, however, ongoing studies in this field, by postgraduate students in different family medicine departments in the country.

2.2. Purpose of the Literature Review:

- To establish the scope and search criteria of the literature that will be reviewed.
- To gain a global perspective of the attendance at EDs in other parts of the world as well as the current situation in South Africa
- To obtain an idea of the type of patients that attend the ED in other parts of the world and in South Africa in terms of demographics, medical domain problems, reasons for attendance and other relevant information presented in the literature.

2.3. Search criteria and search engines used:

Due to the characteristic of the topic for review, different search engines were used, which included Pub Med central, Google and direct searches from within on-line medical journals like the South African Journal of Family Practice (SAJFP) and the American Journal of Family Practice (AJFP).

In Pub Med the key words used for the search were “Emergency Department use/misuse, overcrowding and pattern of attendance”, in combination with ED or as isolated words.

Limits for the search were set to publications in journals and reviews and a time limit for literature published within the last ten years (before 2010). Exceptions to the time limit were applied if the study was within the scope of the topic, and methodology and results were relevant to the current review.

2.4. Review of the Literature

Throughout the world, there are different health systems and ways to manage the ED and it is expected that in developed countries the patients who have an emergency use the ED and those other non-emergency patients will be treated at other available levels of care like General Practitioners (GPs) or clinics. Nevertheless, there is a difference between what is expected and what the reality is in this regard.

2.4.1 Appropriateness of attendance

In South Africa, one research study explored the appropriateness of attendance at an ED. This was a descriptive study, with a sample size of nearly three thousand patients' cards. The objective was to analyse the adequacy of the attendance, using a preset data form with seven criteria, amongst which were the patients' vital signs (temperature), chest pains, significant bleeding, less than 72 hours of onset of the complains and not able to get other kind of help and the presence of trauma . Using these criteria, the result of the study concluded that the ED is used inappropriately.³

In an extensive search, three South studies about attendance to EDs in South Africa were found. It was difficult to evaluate the bigger picture of what is happening in the country, although using the experience gathered during sixteen years working in public hospitals, it is possible to say that this phenomenon is repeated in many of the public institutions, whether a district hospital or an academic hospital.

Two studies in Spain did investigate the attendance pattern in the Emergency Department. The first one was carried out in a county hospital using a qualitative (descriptive) design and measuring variables like spontaneity of the attendance, gender, and distance from the facility. This study found that the majority of the attendance was appropriate as most the attendees were referred from the primary health level to the hospital, and most patients were admitted into the hospital, which is according to the system.⁶ Although this research was not carried out on a large sample, it tested the appropriateness of the attendance using a questionnaire with multiple variables set to evaluate the need for urgent attention or not. It did not use any score system to establish the appropriateness of the attendance, which would decreased the power of the assessment of the appropriateness.

The other study used a similar descriptive design, as the one presented above, however it revealed that the Emergency Department was used by non-emergency cases. This particular study did attempt to use a tool to calculate the inappropriateness of the attendance, by creating a score system where evaluation of different variables with allocated score numbers, would give an estimated total score that could assist in the evaluation of the appropriateness, in terms of a quantitative value.⁷

Research in Galway, Ireland, investigated the patients' and health workers' views of the appropriate use of the Emergency Department, and it found differences in opinion on the adequacy of the attendance, as patients felt the need for ED attention to their problems and the health workers consider the attendance as not appropriate. This study suggested the need to consider the results in the context of the psychological and social situations of the patients, in order to evaluate the attendance as appropriate or not.⁸

It is well recognised that demands for ED attention is increasing all over the world, and countries are battling to cope with this demand. Something that transpires is that if score systems are used to determine appropriateness, medical parameters and the local availability of other care will have to be taken into consideration to allow choices in the seeking of health care.

2.4.2 Reasons for attendance

The findings from a study done in London about the factors contributing to the attendance at the ED, pointed out that the main reason for patients to attend emergency services was social deprivation. The low-income classes would make use of this service more frequently, instead of attending local GP's.⁹ This aspect reveals that the availability of other levels of care is not the only relevant factor, as affordability is another issue, in the non-utilization of other available services. The situation of South Africa with a poverty-related economical burden could be also one of the reasons for the use of ED.

South Africa has a large economically deprived population, as stated in the Millennium Development Goal Report of 2010.¹⁰ This report has highlighted that South Africa has "achieved" the reduction on the percentage of population living below the poverty line from 11.2 % in 2000 to 5 % in 2006. The United Nations Children Fund reported that

South Africa had a Gross National Income (GNI) per capita in 2009 of US\$ 5770 (approximately 42 000 Rand), and the population living below the international poverty line was estimated in about 26 percent.¹¹ Comparing the above-mentioned data with the European Union Report of a GNI in EUR (Euro) 25000 (250 000 Rand) in the same year, the conclusion would be that there is a large gap of economical disadvantage for many South Africans.

A study in England found that patients attend the Emergency Department for convenience in order to avoid long waiting times and this behaviour makes it possible to repeat the visits to the ED. The study expressed the need for education for the new generation regarding GP attendance before Emergency Department attendance in the case of non-emergency illness.¹² Although the data available from South African studies still not broad enough to evaluate this long waiting time situation, one can speculate that this could be also happening here.

Keeping a balance between the number of attendees at other levels of care and what is seen in the ED will minimise shifting from one side to the other with the consequence of overcrowding the EDs. It will be crucial when planning facilities like clinics, to take into consideration the population in the catchment area and adequate staffing of the clinic, to provide in that way an optimal service and minimize the waiting time.

Another British study reported that patients are sent to Emergency Departments by GPs, even though their condition is not urgent and others are self-referred, with the patient perceiving their problem as an emergency.¹³ The first situation entails that good communication between levels, and frequent evaluation of referrals will avoid unnecessary referrals to ED. The latter is about the self-belief of patients and perhaps previous visits to the ED that make patients think their problems are urgent.

A review was done in Springfield, in the United States of America (USA), of the electronic records from patients with 12 or more visits to the ED. The study revealed that those high frequency users did have a medical aid and they were having a medical practitioner, but they chose instead to go to the ED.¹⁴ This shows that own choice to attend the ED is another important reason for attendance.

A cohort study on the use of the ED in a group of Native American Indians in Emory, USA, demonstrated that this population was using the ED for primary care reasons, and this brought about the need for the initiation of a more comprehensive primary care system and a multidisciplinary approach to identify the users and to provide alternative care.¹⁵

Patients can have many reasons for attending the emergency department, with or without urgent problems. This is a complicated situation, and may vary depending upon the cultural and socio-economical backgrounds of the population, as well as historical trends within a community.

2.4.3 Feature of age and gender, in the attendance pattern.

In the West Midlands region of the NHS in Birmingham, UK, the correlation between females and males in the pattern of attendance at the ED showed no difference among the genders, but there was a significant difference in the age groups, with children dominating in the early evening and adults in the early morning hours.¹⁶ This could be due to, the fact that parents wait until they are off work to take their children to the ED.

A study in the USA national survey interview of 1998, which was published in 2002, stated that male patients and African-American or those of Hispanic ethnicity were the most frequent users of ED. This was a large secondary data analysis from previous data and multiple variables were analysed.¹⁷ It is possible that race/ethnicity can be acting as a confounder factor, and can indirectly relate to socio-economical situation.

A review in the national data of attendance at EDs in the U.K showed that elderly patients are particularly likely to attend ED services and in many instances, the encounter is due to socio-economical reasons.¹⁸ It seems that socio-economical situation could be a predictor for the use of ED. The relation between being an elderly patient and the attendance to ED has not been reflected in the South African studies mentioned before.

Two studies found a male predominance in attendance at EDs, one was conducted in Belgium and another in the USA, and both were data analyses from large databases in each country. They also pointed out a relationship between the male patients, foreign

origin, and low income.^{17, 19} The findings above are pointing out to the socio-economical situation once more.

The study done by Le Roux et al in the National Hospital in Bloemfontein, South Africa, showed no significant difference between females and males attending the ED. It was found in the study that females were 50.8 % of the attendees versus 49.2 % of males. There was a median age of 29 years.³

Another study from South Africa, published in the SAJFP reported no significant difference in gender amongst the attendees to ED.⁵ This was however not an in depth descriptive study, and was done over the course of a month at Middleburg Regional Hospital.

As seen in the literature, there is variability in the dominance of one particular gender over the other in terms of the attendance at EDs. The predominance of gender over the other will also depend on the selection criteria, the sample size, and the composition of the population.

2.4.4 Encounter Domain

An American study looked at patients with frequent ED use and found that those making frequent use of the ED were as sick as the group with fewer visits and that these frequent users had more admissions due to illness rather than trauma, and therefore resulted in higher cost per hospital attendance.²⁰

In New Zealand there was a study looking at the situation of the Accident and Medical clinics in Otago, to find out about the attendance pattern. The result of this study demonstrated that young patients were the main users of the services, and they presented mainly for acute medical illness and trauma.²¹

Two South African studies conducted by Le Roux et al, from the Bloemfontein National Hospital, in 2003, and Nkombula from Middleburg Hospital, in 2005, found that trauma patients represented an important number of the patients seen in their respective hospitals.^{3,5}

Variations of predominance amongst the clinical domains is frequently found in the literature, with elements such as the patients, the country itself, and other factors like culture, economic background, educational level and the historical aspect that make one domain more prominent than another.

An example is that in countries with a background of struggle and poverty most presentations will be for medical and trauma related problems. On the other hand, countries with high education and industrial development will possibly show more medical problems and road accidents.

There can be intermediate situations, like could happen in South Africa, where medical problems and trauma can overlap. The role of the HIV/AIDS pandemic and Tuberculosis epidemic can play an important role in the medical domain presentations in many hospitals in South Africa.

2.4.5 Time of attendance

The study published in the SAJFP, which investigated the appropriateness of the visits to the Emergency Room at the National Hospital in Bloemfontein, concluded that patients were using the after hour's services in more than seventy-two percent of cases, and mainly on weekends.³

A study in Sweden by Rasmussen et al and another in Taiwan by Tsai et al found that the early hours of the morning and day time were the most common times for attendance at the ED.^{22,23}

Factors like availability of transport, financial possibilities, family available to accompany patients to the ED during working time, and historical trends of attendance by a community can play an important role in South Africa. The present data available in the literature can limit the power of this statement; therefore, there is a clear need for studies on these topics to enrich the literature.

2.4.6 Triage tools and results of the encounter

It is difficult to ascertain in an ED who is a non-emergency patient and very few accurate

tools are available to use for the screening of patients in that regard. An interesting study done in the Veterans Administration Medical Centre in Washington, USA, used a modified Delphi process to evaluate the safety of re-directing patients to other levels of care, especially for those with non-emergency problems. The study revealed that 19 % of patients met screening criteria for deferred care, and in a follow up of 30 days, none of these patients died or received emergency treatment for their problems.²⁴

An extensive survey of the National Hospital Ambulatory Medical Care data in the USA revealed that only 13 percent from the 102.8 million visits to hospital EDs ended in admission and the majority of the encounters were due to illnesses rather than trauma.²⁵

Another study evaluated the use of published triage methods to delay care for patients in the ED who did not meet the criteria for such treatment. This study, conducted in the University Hospital of California, USA, took 106 patients who did not meet the criteria for ED care, according to the triage methods. From those 106 patients, the study found that 35 patients (33%) had appropriate visits and four of them were admitted. The research concluded that the triage guidelines were not powerful enough tools to refuse care safely of those patients, and that refusal might be hazardous.²⁶

The study by Le Roux et al in Bloemfontein, South Africa, found that the majority of patients were discharged after being seen at the ED.³ It also concluded there was a large number of “inappropriate” visits as related to the result of the encounter.

There was no study in the literature reviewed which indicated that a particular triage method or deferral system was powerful and safe enough to divert patients who attend ED with non-emergency problems. There is a need to test the triage methods available in South Africa, in order to compare their sensitivity to classify a patient to have an emergency or not. The triage method used in our hospital was developed by the ©Cape Triage Group 2005, for Infants, Children and Adults, and is the main tool used to determine how promptly a patient need to be seen in the ED.

2.5 Conclusion

The overall impression from different parts of the world, with recognized well-established health systems reveals that, though primary levels of care are often available for non-emergency patients, there are still large numbers of visits made by non-urgent patients to the ED, which have financial, organizational, and other implications.

In South Africa the general attendance pattern to the EDs seems to be in line with other places in the world, though it there is not much published research about this matter.

In the light of the findings from research around the world, on the attendance at EDs, one can say that the systems used are still far from perfect and the use of the ED by non-emergency cases will probably remain high. Effective public education, screening, or triage tools and getting politician's involvement (first their understanding about the system and thereafter to be able to address the people) in this issue will provide a better result in the usage of EDs, and will ultimately, cut out unnecessary cost, overcrowding, and the misuse of resources.

CHAPTER 3

METHODOLOGY

3.1 Study design:

A descriptive cross sectional study design was used in this research

3.2 Site of the Study

The study took place in the Emergency Department at Carletonville Hospital. This hospital is a level 1 (district) hospital, which provides outpatient and in-patient care for adult and paediatric populations from different medical domains, including Internal Medicine, Surgery and Trauma, Obstetrics and Gynaecology, Paediatrics and acute psychiatric care. The capacity of the hospital at present is 150 beds.

The hospital is located in the Merafong District, which is part of the Westrand Region, and is surrounded by Ventersdorp (Northwest Province) on the north, on the south by Sedibeng Region (Gauteng Province) and to the west by Potchefroom district (Northwest Province) and to the east by Westonaria (Gauteng Province). See Appendix H for a map of Merafong demarcation.

3.3 Study Population

All patients from any age, who attended the Emergency Department at the time of the study and within the months that the study took place (April to August 2009), were included.

3.4 Sample Size:

To determine this, it was decided to use the average number of patients seen monthly in the ED (1800) and using the Statcalc programme, the sample size was set at 250. This is considering a 95 % confidence interval (power), and 50 % of probability.

3.4.1 Sampling

In the research, a systematic random sampling method was used, and sampling was done at different hours of the day (morning – afternoon –night) and during the weekend and public holidays in order to minimize bias due to the time or specific days. Taking into consideration the average number of patients seen monthly in the Emergency Department (1800/month), and dividing this number by the sample size (250) a systematic sample or interval in which patients were selected for the research was decided upon. (This was every seventh patient). There was a starting point in the queue every day, and from there the interval was applied.

3.4.2 Selection or recruitment of subjects

The selection of participants was done as a voluntary process after informed consent was read by the candidate, or explained to him/her, and he/she agreed to participate. Then he/she became part of the research.

3.4.3 Inclusion criteria

All patients attending the ED during the study period, and of any age, were candidates for eligibility. If a patient was critically ill, s/he was to be included, though data was only collected once the status of the patient was stable and consent could be obtained. If the patient was not willing to participate, another patient was included in his/her place until the final sample size was achieved.

3.4.4 Exclusion criteria

Any patient and in the case of a minor, his/her parent or guardian, who did not consent to participate.

3.5 Measuring tool or instrument

A self-administered questionnaire was used (See Appendix C). If a patient was not able to write, the accompanier or the trained nurse helped to fill in the questionnaire using the patient's responses. In the case of a minor, the relative answered the questions.

3.6 Data collection

After every patient arrived in the ED, they were placed in a queue, according to the order of arrival, and from there were assessed by the nurse on duty, during which process vital signs were taken and the patient triaged according to the triage tool used in ED (©Cape Triage Group 2005). Some patients got priority before others depending on the seriousness of their problem.

Once the patients were assessed and a number in the queue was given, every seventh patient was selected as a candidate to participate in the research. They were then taken to a private room, amongst the consulting rooms available and were given the information leaflet (see appendix A) and the consent form (appendix B).

For patients using languages other than the one in the leaflet, a nurse formerly trained on the information, consent, and questionnaire forms, as well as on ethical issues, was used to brief the patients about the research and the questions in the questionnaire.

These two nurses were able to communicate in the most common languages used in the area of the research (Sotho, Tswana, and Zulu). The pilot study served as a tool to make sure that the answers given by patients were translated into English with the same content as the participant's responses.

After the participant had given written consent to participation, the researcher filed the consent form, in order to prevent anyone else knowing the identity of the patient or participant. Neither the researcher nor the collaborator nurse had the name of the participant with him/her at the time the questionnaire was self administered by the participant.

The candidate was given the questionnaire, which he/she completed in the private room, alone, while support and clarification on the content and questions was offered only if he/she requested it.

If the seventh patient declined to participate, he/she received a verbal acknowledgement for their time and then the next patient in the queue was chosen to be included in the sample. In total 11 patients declined to participate and two patients who due to the

severity of their problems, could not give consent and were transferred to another hospital, did not take part in the study.

This process occurred on different days of the week during morning, afternoon, and night shifts, from the starting point on April 28th to the last patient selected on August 8th of 2009, until the total sample was collected. An attempt was made to sample the same hours of the day and night across weekdays and weekends, i.e. on some Mondays samples were taken in the morning, other Mondays in the afternoon and on yet other Mondays at night. The same sampling hours were used over weekends. This allowed us to divide the attendants into two groups: **‘Working Hours’** (from 07h30 to 16h00 [Monday to Friday]) and **‘After Hours’** (from 16h00 to 07h30 on weekdays [Mondays to Fridays]), and from 16h00 on Fridays to Mondays at 07h30 (i.e. over the weekends).

3.6.1 Data capturing:

The data was entered from the questionnaire forms into the Epi Info programme V 3.4.1, where it was stored for further statistical analysis.

3.6.2 Pilot Study:

A pilot study was conducted to test the measuring tool and the sampling methods. This pilot study took place in the ED and included 10 patients that did not form part of the sample in the research. It was done in the ED of Carletonville Hospital. It started on February 13th and ended on February 15th. In this pilot study a similar questionnaire was used and it served to modify the content of some of the questions to make it more understandable, as well as to estimate the average time of the interview and also served to train the two nurses who volunteered to help with the language to become familiarized with it.

After the data was collected, it was entered in the Epi Info programme. Thereafter a minimized analysis of that data was done, as a framework for the larger analysis on the research that followed.

3.6.3 The questionnaire content

The questionnaire used was formulated from the input of colleagues, the researcher, and information gathered from previous research that was reviewed as part of the literature review process. The questionnaire started with socio-demographic questions: gender, age, employment status, and place of residence. Other questions explored the reason for the encounter, the time of the encounter and other aspects, in open-ended and closed questions. The last part of the questionnaire included a section on the patient's self-rating of the seriousness of the problem and a selection box on the expectation from the patient of the service to be received. There the patient was also asked to rate his/her own priorities.

3.6.4 Sources of bias:

- **Sampling bias:**

The way the recruitment and interval for the selection of subjects was done could pose some bias in the sampling. In order to minimize the impact of this bias in the results of the study it was considered to do sampling across different times of the day and of the week. The systematic selection of patients in an order of sevens, and the voluntary participation of the subjects tried to reduce such a source of bias.

It was not foreseen in the project that a low number of participants would be seen after midnight, due to the application of the sequence of every seventh patient in the queue being selected. On the days on which the data was collected after midnight, only a few questionnaires (3) were completed, because the number of attendees in those hours did not meet the criteria for the systematic sampling of every seventh patient. This could pose a bias, as some relevant participants could be missed and therefore influence the overall results of the research.

- **Information bias**

The design of the measuring tool, a self-administered questionnaire, could bring about information bias, due to the type of questions asked in the questionnaires and the type of answer given by the respondents, which could be influenced by the environment and the

presence of the researcher in the vicinity. To minimize this, a pilot study was conducted to test and adjust the measuring tool, the quality of the questions asked and the possible simplification of such questions. It also served to train and test the performance of the two nurses used to help with translation during the data collection.

3.6.5 Ethics:

- **Identification Issues:** This research used a questionnaire, where no identification data were entered. The questionnaire was anonymous (no names or file number) and only an order number was allocated to enable the retrieval of information and entry into the Epi Info programme. Once the data from the questionnaire was extracted into the Epi Info, the questionnaire form was locked in the researcher's home (lockable drawer), where only the researcher had access to it. The data in the Epi Info was secured using the Epi lock utility of the programme, which uses a password and encryption of the data.

- **Value of the research:**

- To the institution: This research gathered epidemiological information about the pattern of attendance at the Emergency Department in Carletonville Hospital. No other research has been conducted in this area in the hospital and therefore the results of this investigation can provide information for planning and organization of the emergency services in the hospital.

- **Just and fair process:** The inclusion and exclusion criteria were highlighted in the relevant section.

- **Benefits:**

To the participants: This study did not give a monetary or other personal value to the individuals included in the research, but their participation was duly acknowledged and feedback, if desired by any participant can be provided.

- **Risks:** There were some risks involving the participants, as some of them had life-threatening conditions, but in order to minimize the risk, attention was paid to

stabilizing any participant who was or became unstable or was at potential risk during the interview and a follow up for completion of the questionnaire was done later. In other instances, the accompanier was used as a source of information.

- **Respect for participants:** A consent form was presented to the relevant participant and after having any doubt about the research answered, the candidate signed the consent and then the questionnaire was applied. The participant was asked at the end of the session if he/she would like to know the result of the study and if the answer was yes, a visit was arranged for the period that the research was due to be completed so that the result could be revealed and explained.
- **Conflict of interest:** There was no personal or profit interest relating to purpose of this research for the researcher. The only conflict would relate to the interest of the researcher in completing the study in order to complete the last part of the Master's Degree programme for Family Medicine.
- **Approval by the Research Ethics Committee:**

Approval by the Human Research Ethical Committee (HREC) (Medical) at Witwatersrand University was requested and a clearance certificate was obtained (see Appendix G)

- **Other approval or consent:**

A written consent and approval was obtained from the Chief Executive Officer (see Appendix D), as well as from the ED Unit Manager (see Appendix E) at Carletonville Hospital.

3.6.6 Data Analysis:

In order to do the analysis of the data, the Epi Info programme version 3.5.1 was used. Different types of statistical analysis were used depending upon the type and number of variables analyzed as well. In general, frequencies and percentages, tabulation and cross-tabulations were applied.

3.6.7 Problems / Limitations

The collection of the data in the busiest hours of the day was difficult. The use of one language for the information sheet, the consent form, and the questionnaires also could have caused some problems with the patients' understanding of the above information, and therefore the answers given. To minimize this, two nurses were trained on the content of the forms, so it could best be explained to the participants and the relevant answers obtained.

Another limitation of the study was related to the accuracy of the reports from the patients while answering the questionnaire, due to the time of attendance, health conditions, their own honesty, and the socio-economic and educational levels of the participants. The questions were in simple language, and mostly open-ended, to reduce this limitation.

There was also a limitation in not being able to anticipate the low number of questionnaires administered after midnight, when the selection of every seventh patient from the low number of candidates to participate in those hours only allowed applying the questionnaire in three cases, with the possibility of missing important participants.

During the collection of the data, time management was crucial, to avoid delays for the patient and the researcher.

CHAPTER 4

RESULTS

4.1 Introduction

This chapter will provide a description of the results and a presentation of these results divided into: Demographic data; clinical problems or domains; factors related to the patients; factors related to the system; factors related to the environment.

4.1.1 Demographic Data

4.1.2 Age groups

In the questionnaire, participants' ages were requested. The ages were grouped into eight groups, taking into consideration that the paediatric age accepted currently in South Africa is under 13 years (over that age patients are attended to in adult clinics or wards), and a consecutive interval of 14 years was applied for every group. From the ages entered, a calculation was done of the mean age (39), the median (20), and the mode (83). Table 4.1 below summarizes the age groups.

The greater number of patients was found to be in the age group of 14 to 28 years with 91 participants (37 %), followed by the group of 29 to 42 years with 76 (30 %). The elderly group > 71 years had very few participants. If combined, the groups from over 14 to 28 years and the 29 to 42 years together make about 70 percent of the total sample.

Table 4.1 Age groups

Age groups	Frequency	Percent
0-13	37	14.8
14-28	91	36.4
29-42	76	30.4
43-56	35	14.0
57--70	8	3.2
>71	3	1.2
Total	250	100.0

4.1.3 Gender

In the research, there were 145 (58.0 %) males and 105 (42.0 %) females. There were relatively more males than females. Figure 4.1 below shows the distribution by gender.

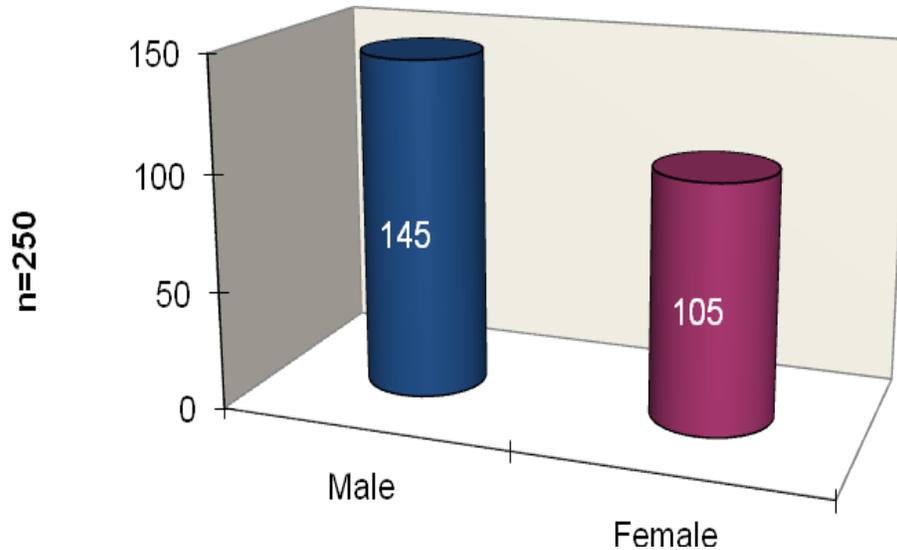


Figure 4.1 Gender distribution

4.1.4 Employment status

The participants' working status was grouped into three categories of employment (Employed, unemployed and pensioner) as shown in the Figure 4.2 below. To categorise a participant as employed, their being remunerated or generating an income in the private sector or the public service was considered. From 250 participants, there were 211 patients from 15 years and older (legal age for employment in South Africa). Of these 127 (60.2 %) were not working and only 79 (37.4 %) were employed. A limited number of patients (5) were within the retirement age (2.4 %).

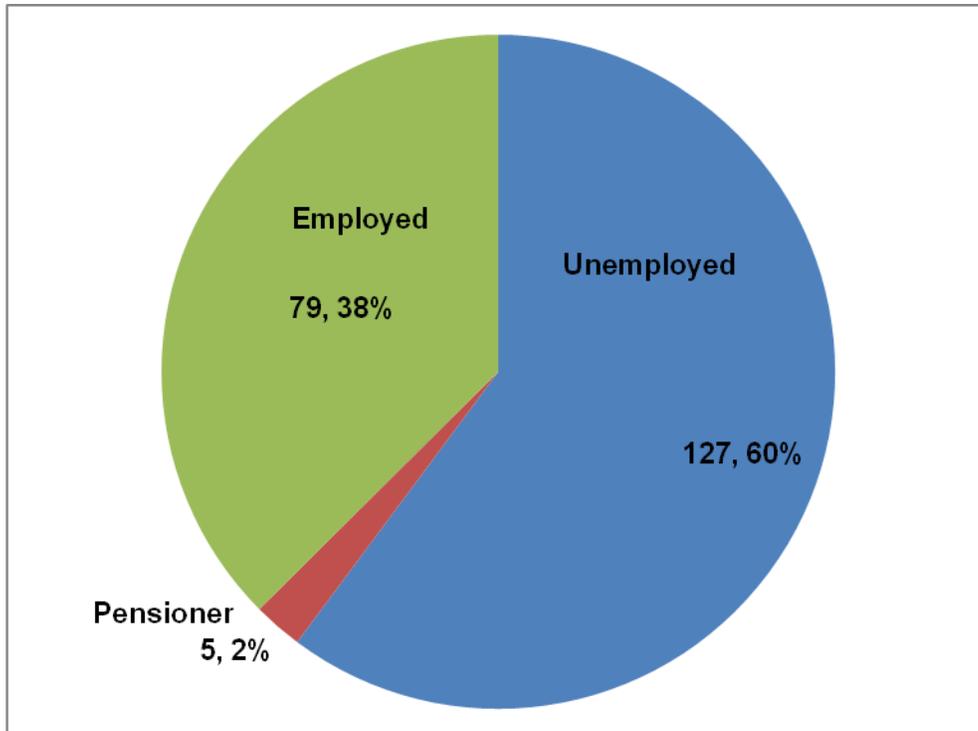


Figure 4.2 Employment status of patients >15 Years old

4.1.5 Residence

In the questionnaire, the participants were asked what their place of residence was. Nine groups, for easy classification and statistical analysis, represent the places of residence reported by the participants. Patients living in the Khutsong area comprised 31.6 % of the total number of patients, followed by Carletonville town with 15.6 % and Wedela Village with 10.4 %.

The Mines Villages (10 %) are comprised of small villages in the mines surrounding Carletonville (Eastdriefontein, Western Deep Levels, and Blybank). Other locations include other small villages around towns like Wonderfontein and Rooiport.

Fochville is about 20 km away from Carletonville town, and despite that distance, 16 patients (6.5 %) came to the hospital from there. There is also no afterhours clinic service in that area. (See Table 4.2 below and Appendix H for a reference map of the demarcation of the Merafong District).

Table 4.2 Residence

Place of Residence	Frequency	Percent
Khutsong	79	31.6
Carletonville Town	39	15.6
Wedela	26	10.4
Mines Villages	25	10.0
Kokosi	22	8.8
Other	20	8.0
Fochville	16	6.5
Outside Carletonville	12	4.8
Blyvoor	11	4.4
Total	250	100.0

4.2 Clinical Problems or Domains

During the data collection, the participants were asked about the problem(s) that brought them to the ED. The clinical problem or domains of their complaints were categorized into eight major clinical categories shown in Figure 4.3

Medical patients numbered 75 (30.0 %). Other clinical problems followed in descending order, such as non-violence related trauma with 61 patients (24.4 %), violence related trauma in 59 patients (23.6 %), surgical patients other than trauma in 23 cases (9.2 %).

Paediatrics, obstetric and gynaecology, and psychiatry followed, in descending order. It is remarkable that trauma patients (non-violence and violence related) represented nearly half of all participants with 120 (48 %).

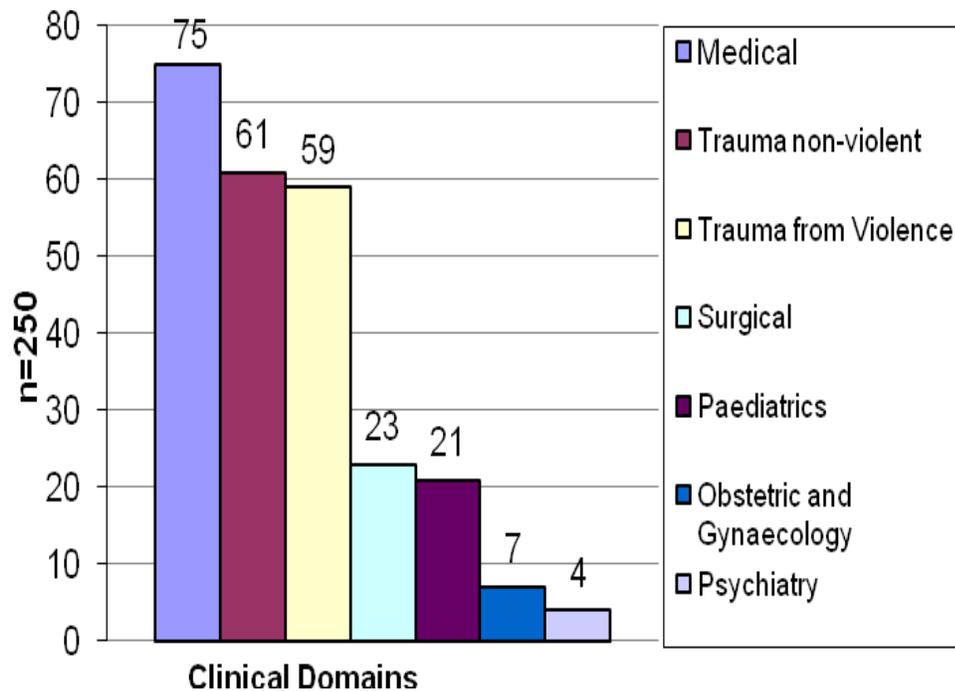


Figure 4.3 Clinical problems or domains

4.3 Factors Related to the Patients

4.3.1 Time of attendance

In the questionnaires, the time of entering into the Triage area at the ED was registered, in hours and minutes. From there a sub-categorization of attendance into the two groups of "Working Hours" and "After Hours" was done. Attendance during working hours was considered as taking place during the regular working hours, which are Monday to Friday from 07h30 to 16h00. After hours was the period that occurred from 16h00 to 07h30, Monday to Thursday, and from Friday 16h00 to Monday 07h30. This last category also included any holidays. Patients were more frequently in the group of "After Hours" i.e., 197 (78.8 %). (See Figure 4.4 below).

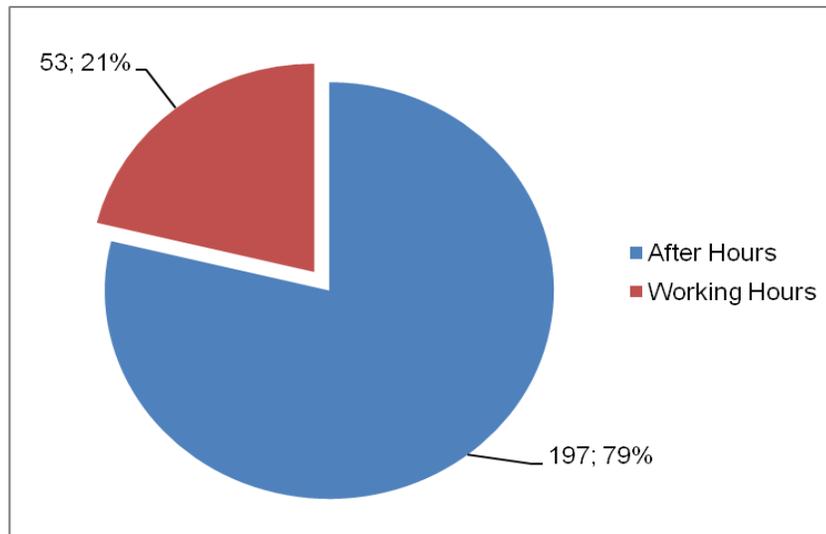


Figure 4.4 Time of Attendance

4.3.2 Own perception of possible time to attend or not attend the Emergency Department.

Participants were asked if they thought it would have been possible to attend at another time, taking into consideration the lapse of time from the initiation of symptoms/signs until their presentation to the Emergency Department. Their answers are summarized in table 4.3. The majority of patients answered that they were not able to attend at another time (87.6 %), despite the severity or urgency of their problems. Only 31(12.4 %) participants recognized that they could come at another time.

Table 4.3 Own perception of possible time to attend or not the Emergency Department

Possibility of attending ED at another time	Frequency	Percent
Could attend at another time	31	12.4
Could not attend at another time	219	87.6
Total	250	100.0

4.3.3 Reasons for time of attendance

Related to the question about the possibility of attending the ED at another time (section 4.3.2 above), patients were asked for the reasons for their answers. The answers, classified to twelve groups, are presented in table 4.4. Over forty-five percent of participants came to ED due to worsening of their problems. The next larger group (15 %) were those that chose to come as their “own choice” of that time.

Other participants answered that they came at that time as they thought their problems needed hospital care (14.4 %) and 27 patients (10.0 %) said they did not have transport to come earlier. Amongst other reasons (5.6 %) were “Nobody to bring me before”, “waiting for police forms” and “waiting for my manager”. Another said that they did not have money (2.8 %) and the lesser group went to either the clinic (2.0 %) or the GP (1.2 %) before going to the ED. One patient (0.4 %) said that he has attended the ED because there was no doctor at the Clinic, and it was expected that more patients would say that instead.

Table 4.4 Reasons for time of attendance

Reason of time of attendance	Frequency	Percent
Problem is worse	113	45.2
Own choice to come at this time	38	15.2
My problem need hospital care	36	14.4
No transport available to come before	27	10.8
Other Reasons	14	5.6
No money to come before	7	2.8
I went to the clinic before coming here	5	2.0
I went to the GP before coming to ED	3	1.2
No equipment/treatment available at clinic	2	0.8
I prefer the Hospital	2	0.8
Need to get police form J88 before	2	0.8
No doctor available at the clinic	1	0.4
Total	250	100.0

4.3.4 Length of time the patient had experienced the problem

Participants were asked for how long they had had the particular problem for which they were seeking attention. In this regard, the length was seen as the time from initiation of symptoms and signs up to the time the participant presented to the Emergency Department.

Their responses are represented in five categories, which start from day zero, and progress in four day intervals up to the category of '15 days or more'. Table 4.5 below shows the categories. It is generally considered that an acute problem has a duration of less than 72 hours (3 days), while from four to seven days is considered a sub-acute problem, and after more than 15 days a problem is seen as chronic.

The majority of patients (n=196) (78.4 %) responded that their problem started within the three days prior to the visit, which means that most patients had an acute problem.

Table 4.5 Length of illness or problem from initiation of symptoms to presentation at the Emergency Department

Duration Illness	Frequency	Percent
0 - 3 days	196	78.4
4 - 7 days	37	14.8
8 - 10 days	1	0.4
11 - 14 days	5	2.0
15 days or more	11	4.4
Total	250	100.0

4.3.6. Self-rating of the severity of their problem

One of the questions asked of the patients was to select, on a scale of four choices of severity, which one they thought described their problem. From their answers, the intention was to identify how seriously the participant rated his/her problem, and from there to compare this rating with the score of the triage assessment, to be able to see how close or far from the triage result they were.

This would allow us to see if the self-rating of the patients was a true reflection of the severity of their illnesses according to the triage tool used. Table 4.6 below presents these categories. A large number of patients (62.0%) rated their problems as very serious. In contrast, only one patient considered the problem “not serious”.

Table 4.6 Distribution of self-rating of severity

Self rating of severity	Frequency	Percent
Very Serious	155	62.0
Serious	60	24.0
Not very serious but needs attention	34	13.6
Not Serious	1	0.4
Total	250	100.0

4.3.7 Self-rating of expected service

All participants were asked what they would expect from the service and lists of 14 possible choices were given in the questionnaire, which they rated in a numerical order of priority, starting from one. Four of those choices were rated as a first priority by different patients.

The commonest expectation was “to be examined by a doctor”. It was followed by “To be helped by a nurse” as second. “Medication” and “x-rays” followed with less frequency. It is remarkable that a great number of participants attended the ED with the objective of being seen by a doctor. (See table 4.7)

Table 4.7 Ratings of first choice of expectation from service

Expectations from service	Frequency	Percent
Examined by a doctor	161	64.4
Helped by a nurse	85	34.0
Medication	3	1.2
X-rays	1	0.4
Total	250	100.0

4.4 Factors Related to the System

4.4.1 Transport use

The candidates ticked in the questionnaire which one of the listed transport modes they used. Ambulances were most frequently used to come to the ED (51.2%). Private transport followed this and public transport (which includes any type of taxi or bus). Other transport modes included riding a bicycle and walking. See table 4.8

Table 4.8 Type of transport used to reach ED

Transport used	Frequency	Percent
Ambulance	128	51.2
Private	82	32.8
Public	36	14.4
Other	4	1.6
Total	250	100.0

4.4.2 Use of other levels of health service

One crucial question to the participants was if they could attend any other level of care available in the district, like local Clinics or General Practitioners and the reasons for their answers of Yes/No. An important number of patients answered that they could not attend any other level of care available, except the Hospital (79.2%). Only 20.8 % considered that they could attend other levels of care. See Table 4.9.

Table 4.9 Attendance at another level of care

Could attend other level of care?	Frequency	Percent
Yes	52	20.8
No	198	79.2
Total	250	100.0

4.4.3 Reasons for the use/not use of other levels of care

After the participants answered the question about the attendance at another level of care, they were also asked to give reasons for their response. The answers were plotted in ten groups. Results showed that “clinic is closed” accounted for 27.6 %, followed by “clinic is not helpful in” 14.8 %, and “Clinic or GP always refers me to the hospital and so it is a waste of time to go there first” in 12.4 %. “No Doctors available at the clinic” accounted for 12 % of the answers, when it was expected a larger number of patients that could be giving this reason.

The reason of “Clinic has no equipment or medications” was expressed by 29 participants (11.6 %). A group of 21 (8.4 %) attendees did not give any reason for the use or not of any other level of care. Amongst other reasons (4 %) were answers like “I do not like to go to the Clinic, “I do not have clinic nearby” or “my problem need hospital

care”. Smaller number of patients gave other kind of answers like “I never go to the Clinic”, and “No money to attend GP”. Table 4.10 below summarizes the reasons.

Table 4.10 Reasons for the use/non-use of other levels of care

Reasons for use/non use of other levels care	Frequency	Percent
Clinic is closed	69	27.6
Clinic is not helpful	37	14.8
Clinic or GP refers me to Hospital	31	12.4
No Doctors available at the clinic	30	12.0
Clinic has no equipment or treatment	29	11.6
No reasons given	21	8.4
Problem need hospital care	10	4.0
Other reasons	10	4.0
I never go to the Clinic	8	3.2
No money to attend GP	5	2.0
Total	250	100.0

4.4.4 Triage colour code of every case

In our Emergency Department, the triage system adapted from the ©Cape Triage Group 2005, for Infants, Children and Adults is used. This triage system uses a colour code to categorize patients depending on the vital signs, mobility, alertness and the presence or not of trauma. The colours are in descending order of seriousness: red (most serious), orange, yellow, green, and blue (dead). In this research, the first four colours were used, as all patients were alive. In figure 4.5, the distribution of patients according to the triage scores is shown. A great number of patients were categorized as green (59.6%), which was followed by Yellow (31.2%), orange (6.0%), and red (3.2%), respectively.

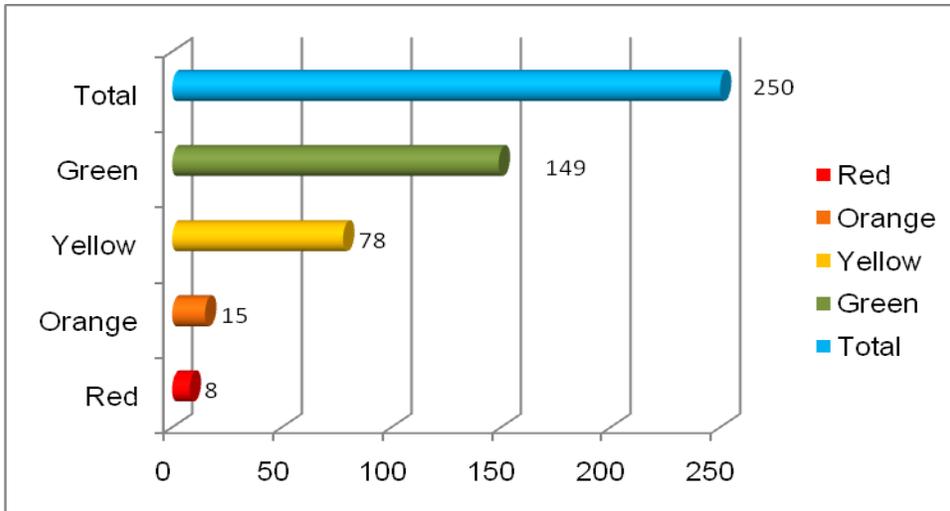


Figure 4.5 Distribution of patients according to the triage scores

4.4.5 End-result of the encounter

Another important aspect of the questionnaire was to find out the result of the encounter for the participants. This was categorized in three main groups, which were discharged, admitted, or transferred. A very important percentage of patients were discharged from the ED and allowed to go home (n=198) (79.2%), 19.6% were admitted, and a small amount (1.2%) were transferred to other institutions for further management of their conditions. A summary of this is in figure 4.6 below.

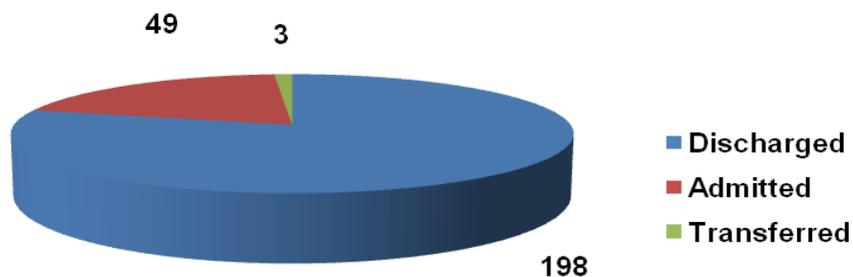


Figure 4.6 Encounter End-results

4.5 Association between Variables

The research looked at possible associations between different variables. A tabulation using the chi square analysis was done between two or more variables. Some of the most important results are shown below.

4.5.1 Associations between age groups and encounter domains

A cross tabulation of age and encounter domain, shown in table 4.11, depicts a significant relationship ($p < 0.001$) between the age groups of 43-56 and 57-70 years and the medical domain (57.1 % and 62.5 % respectively). Another relevant association was the trauma related to violence and the age group of 14-28 years (35.2 %).

Table 4.11 Age groups and encounter domain

Age groups	Medical (n) (%)	Trauma Non- violence (n) (%)	Trauma violence (n) (%)	Surgical Non- trauma (n) (%)	Paeds (n) (%)	O&G (n) (%)	Psychiatry (n) (%)	TOTAL (n) (%)
0-13	3 8.1	5 13.5	0 0.0	8 21.6	21 56.8	0 0.0	0 0.0	37 100.0
14-28	20 22.0	28 30.8	32 35.2	6 6.6	0 0.0	4 4.4	1 1.1	91 100.0
29-42	26 34.2	18 23.7	22 28.9	6 7.9	0 0.0	3 3.9	1 1.3	76 100.0
43-56	20 57.1	7 20.0	4 11.4	2 5.7	0 0.0	0 0.0	2 5.7	35 100.0
57--70	5 62.5	2 25.0	1 12.5	0 0.0	0 0.0	0 0.0	0 0.0	8 100.0
>71	1 33.3	1 33.3	0 0.0	1 33.3	0 0.0	0 0.0	0 0.0	3 100.0
TOTAL	75 30.0	61 24.4	59 23.6	23 9.2	21 8.4	7 2.8	4 1.6	250 100.0

4.5.2 Correlation of own perception of severity and triage colour codes

In a tabulation of the participants' own rating of their perceived severity and the triage colour-coded evaluation of their problems, no association ($p=0.037$) was found. From one hundred and fifty four (154) patients that rated themselves as very serious, 86 (55, 8 %) were hand coded as green by the triage assessment, which indicates they should not have required immediate attention in the ED. A low number of patients ($n=7$) were scored in the red code (4, 5 %). Table 4.12 represents these findings.

Table 4.12 Own perception of severity and triage colour

Own Perception of severity	Triage Colour Code				
	Red (n) (%)	Orange (n) (%)	Yellow (n) (%)	Green (n) (%)	Total (n) (%)
Very Serious	7 4.5	12 7.8	49 31.8	86 55.8	154 100.00
Serious	2 3.2	3 4.8	19 30.6	38 61.3	62 100.0
Not very serious but need attention	0 0.00	0 0.00	9 27.3	24 72.7	33 100.0
Not Serious at all	0 0.00	0 0.00	0 0.00	1 100.00	1 100.00
Total	9 3.6	15 6.0	77 30.8	149 59.6	250 100.0

4.5.3 Association between Places of residence and encounter domains

The research looked at the possible association between the places of residence and the encounter domain. It intended to find out if Carletonville municipality had a specific type of patient (domain) that comes to the ED. It was thought that more trauma patients would be coming from the locations where more violence and lower income are the

norm. At the time of doing the correlation there were no significant associations ($p=0.601$) between the places of residence and the encounter domain. (See table 4.13)

Table 4.13 Relationship between Places of residence and encounter domain

Place of Residence	ENCOUNTER DOMAIN							
	Medical	Trauma Non-violence	Trauma from violence	Surgical other than trauma	Paeds	Obst. and Gynaec	Psychiatry	TOTAL
Khutsong	26 32.9	13 16.5	18 22.8	9 11.4	9 11.4	2 2.5	2 2.5	79 100.0
Carleton-Ville Town	9 23.1	13 33.3	10 25.6	4 10.3	2 5.1	1 2.6	0 0.0	39 100.0
Wedela	4 15.4	6 23.1	10 38.5	1 3.8	2 7.7	3 11.5	0 0.0	26 100.0
Mines Villages	5 20.0	9 36.0	7 28.0	2 8.0	2 8.0	0 0.0	0 0.0	25 100.0
Kokosi	9 40.9	2 9.1	5 22.7	3 13.6	2 9.1	0 0.0	1 4.5	22 100.0
Other	5 25.0	7 35.0	4 20.0	2 10.0	2 10.0	0 0.0	0 0.0	20 100.0
Fochville	9 56.3	3 18.8	2 12.5	0 0.0	2 12.5	0 0.0	0 0.0	16 100.0
Outside Carletonville	6 50.0	4 33.3	1 8.3	1 8.3	0 0.0	0 0.0	0 0.0	12 100.0
Blyvoor	2 18.2	4 36.4	2 18.2	1 9.1	0 0.0	1 9.1	1 9.1	11 100.0
TOTAL	75 30.0	61 24.4	59 23.6	23 9.2	21 8.4	7 2.8	4 1.6	250 100.0

4.5.4 Correlations of places of residence and mode of transport used

There has been a perception in the ED that patients are using ambulance services even from Carletonville town, which is relatively close to the hospital. An important association was found between the places of residence and the mode of transport used. From the sample of 250 participants, 128 (51.2 %) participants used the ambulance services, 51 of them were living in Carletonville town (64%) (P=0.001). On the other hand, people, living in Khutsong location more frequently used private transport. (See Table 4.14)

Table 4.14 Places of residence and transport used

TRANSPORT USED					
Place of Residence	Ambulance (n) (%)	Public (n) (%)	Private (n) (%)	Other (n) (%)	TOTAL (n) (%)
Khutsong	13 33.3	4 10.3	20 51.3	2 5.1	39 100.0
Carletonville Town	51 64.6	14 17.7	14 17.7	0 0.0	79 100.0
Wedela	16 72.7	2 9.1	3 13.6	1 4.5	22 100.0
Mines Villages	16 61.5	5 19.2	5 19.2	0 0.0	26 100.0
Kokosi	3 27.3	0 0.0	8 72.7	0 0.0	11 100.0
Other	9 56.3	3 18.8	3 18.8	1 6.3	16 100.0
Fochville	8 32.0	4 16.0	13 52.0	0 0.0	25 100.0
Blyvoor	9 45.0	2 10.0	9 45.0	0 0.0	20 100.0
Outside Carletonville	3 25.0	2 16.7	7 58.3	0 0.0	12 100.0
TOTAL	128 51.2	36 14.4	82 32.8	4 1.6	250 100.0

4.5.5 Association between: age groups and “to be examined by a doctor”

There was no association ($p= 0.821$) between age groups and the choice of being examined by a doctor. Table 4.15 below shows that 246 patients attended the ED to see a doctor as indicated by their choices of expectation from the service, at any ranking level. From those, 161 (65.4 %) came to the ED to be seen by a doctor as their first choice of the expected service.

Table 4.15 Age groups and “to be examined by a doctor”

EXAMINE BY A DOCTOR				
Age groups	First choice (n) (%)	2nd choice (n) (%)	3rd choice (n) (%)	TOTAL (n) (%)
0-13	25 67.6	12 32.4	0 0.0	37 100.0
14-28	57 63.3	31 34.4	2 2.2	90 100.0
29-42	53 71.6	21 28.4	0 0.0	74 100.0
43-56	18 52.9	16 47.1	0 0.0	34 100.0
57-70	5 62.5	2 25.0	1 12.5	8 100.0
>71	3 100.0	0 0.0	0 0.0	3 100.0
TOTAL	161 65.4	82 33.3	3 1.2	246 100.0

4.5.6 Expectations from the service and own perception of severity

From the total sample of 250 respondents, 156 (62, 4 %) rated their attendance as very serious, and 103 (64 %) of those patients in this category of very serious came mainly to be examined by a doctor. No statistical significance was found in this association ($p > 0.09$). See table 4.16.

Table 4.16 Firsts Expectation from the service and perception of severity

Expectation from the service	Own perception of severity				Total (n) (%)
	Very Serious (n) (%)	Serious (n) (%)	Not very Serious but need attention (n) (%)	Not Serious at all (n) (%)	
To be Examine by a Doctor	103 64.0	40 24.8	17 10.6	1 0.6	161 100.0
To be helped by a nurse	51 60.0	19 22.4	15 17.6	0 0.0	85 100.0
Medications	2 66.7	1 33.3	0 0.0	0 0.0	3 100.0
X-rays	0 0.0	0 0.0	1 100.0	0 0.0	1 100.0
TOTAL	156 62.4	60 24.0	33 13.2	1 0.4	250 100.0

4.5.7 Triage Colour and End result of the encounter

Another interesting correlation was done to find out if there was any association between the colour of the triage given to the participants and the end-result of the encounter. There was a strong association ($p < 0.001$) in the group of patients that were coded

green, as 95.3 % of them were discharged, and on the other hand, 66.7 % of patients coded red were admitted. It might show the value or power of the triage system used. (See table 4.17)

Table 4.17 Triage Colour and End result of the encounter

Triage Colour	End result of the encounter			Total (n) (%)
	Discharged (n) (%)	Admitted (n) (%)	Transferred (n) (%)	
Red	3 33.3	6 66.7	0 0.0	9 100.0
Orange	4 26.7	11 73.3	0 0.0	15 100.0
Yellow	50 64.9	24 31.2	3 3.9	77 100.0
Green	142 95.3	7 4.7	0 0.0	149 100.0
Total	199 79.6	48 19.2	3 1.2	250 100.0

CHAPTER 5

DISCUSSION

The Emergency Department in Carletonville Hospital offers a multidisciplinary service 24 hours a day, seven days a week throughout the year. In an average month, it is possible to see about 1800 patients, with over 15000 per year. For a small district hospital, with limited personnel and other resources, it represents a challenge to cater for this number of patients and at the same time to offer them a proper service.

5.1 Demographic data

5.1.1 Age groups

The result of the study showed, that patients from age group 14 – 28 years represented over 37 percent of the attendees. The explanation for this could be the arrangement of the age groups. Though there is not a formula to determine the age groups interval, it was arranged in a sequence of 14 years in order to present the paediatric patients in the first group, and separate them from the rest of the sample.

This grouping allows for a better picture of adult patients in the research. In general, a great number of participants were between the ages of 14 to 42 years (Age groups of 14 to 28 and 29 to 42), making together nearly 70 % of all attendees (table 4.1). Amongst this group are the younger population, who are expected to be in the active part of their life, and should not be attending the Emergency Department due to medical problems, which was the main clinical problem to be attending the ED in the research.

Some studies have looked at this issue and have found that attendees are of a younger age.^{27, 28} Taking into consideration the latest published census in South Africa, by the time of this research, the current life expectancy is 47 years for males and 48 years for females (48 years for both sexes).²⁹ The aging rate of the population and the life expectancy in a specific country can play a role in this matter as was found in this research.

There are different factors that are causing a low life expectancy in South Africa, and two of them are the HIV/AIDS pandemic and the tuberculosis, which despite a huge effort by the government to provide free antiretroviral and anti-tuberculosis treatment, still causing a great number of deaths. Many attendees seek medical care due to these two diseases or their complications.

5.1.2 Gender

In the study, there were 145 (58.0 %) males and 105 (42.0 %) females. There was no statistical difference between the numbers of each gender. The selection method in the research could have played a role in this result, though the selection was of those attendees who fitted into the selection interval and the agreed to participate in the research.

Other studies have found that males are predominantly the attendees to ED,³⁰ and related it to more frequent trauma and assaults.³¹ Other studies that also looked at this variable, found no difference in number of each gender amongst the ED attendees^{3, 5 32,}

33

The results from studies in various part of the world and in South Africa, reveals that a specific predominance of one gender over the other will depend on many factors, which includes the study population, the selection criteria and the method used for the selection.

5.1.3 Employment status

There were 211 patients, whose age was over 15 years old. From them 127 (60.2 %) were not working and only 79 (37.4 %) were formally employed. A limited number of patients were within the retirement age (n=5) (2.4 %). In South Africa, the legal age for employment is over 15 years, so this was the cut off age when looking at the employment status of attendees.³⁴

Researchers that investigated this variable have concluded that in their study population, over 60 % of Accident and Emergency attendees were from non-productive groups.⁶ There is no discrepancy with these findings in the results of our study, as the unemployment rate in South Africa is over 24.6 % of the population over 15 years and

below 65 years of age.³⁵ The Gauteng Province reported a 25, 7 % unemployment rate by the end of the last quarter of 2009. ³⁶

Unemployment is highly related to economical deprivation, hunger, and poverty, which in the other hand has been related in many research, to the high attendance at the ED.^{17,19} Taking into consideration the combination of unemployment and poverty that affect many South Africans, it is therefore understandable that such population would be attending the ED. Furthermore, this type of patient cannot afford to go to private facilities, and may use the ED as their point for medical attention.

5.1.4 Place of Residence

Our research looked at the place of residence of the participants, to obtain an idea of from which location most of the attendees came. Patients living in the Khutsong area comprised 31.6 % of the total number of patients (n=250), Carletonville town patients represented 16 % of the participants. Other locations comprised other small villages like Wedela, Blyvoor and other small areas. See appendix H for a map reference of some of the locations above-mentioned.

The explanation for this result comes by taking into consideration that in Khutsong location there is a large settlement of patients, and it was expected in the research that a significant number of attendees would come from that area. Nevertheless, Khutsong is situated in the northwest part of the district and about 15 Km from the hospital.

Another expectation in the research was that Carletonville town would have a larger representation of attendees, due to the shorter distance from the hospital (3 – 4 Km approximately).

The literature reveals that patients living near the Hospital do not frequently attend the ED.²⁷ This statement also corresponds to our findings, as patients from Carletonville town represented the second most frequent number of attendees as compared with the further away Khutsong area.

5.1.5 Clinical problems or domains

Some research about attendance at EDs states that medical conditions dominate, followed by surgical and trauma.^{6,37,38} The results of our research show that medical patients comprised about 30.0 %.

Other clinical problems were of lower frequency such as non-violent trauma related (24.4%), trauma from violent acts (23.6 %) and surgical non-trauma related (9.2 %). Paediatrics (8.4%), obstetrics and gynaecology (2.8 %), and psychiatry (1.6 %), followed in descending order.

These can be related to the type of population that attends the ED in our hospital, which is in the young to middle age group, and which frequently comes from areas where the mixed situations of medical and trauma (non-violent or violence related) are a common problem encountered by this population.

The surrounding areas of the town are made of villages built from informal settlements, which do not qualify for either as urban area or as a rural area. These kinds of settlements are typical in South Africa, and are provided with limited sanitation and other resources and inhabited by a low-income population. In this area live the most vulnerable population, not only for medical illness, but for trauma as well.

The literature have not pointed out a strong link between poverty and violence,¹⁰ but have mentioned the vulnerability of the poor and low income population for getting sick and being subject to violence (domestic or other type), and therefore attending the ED for these problems.

The research did not look at the proportion of medical patients who have Human Immune Deficiency Virus/ Acquired Immune Deficiency Syndrome (HIV/AIDS) or tuberculosis (TB) related problems. The present situation of these two conditions in South Africa,^{39,40} where the HIV affects about 33 % of the population in some degrees, make possible to think that many of the medical attendees could be affected by these two conditions.

5.2 Factors Related to the Patients

5.2.1 Time of attendance

Patients in our study frequently came during after hour's services (78.8%). It was not possible to link it to transport availability and to the Emergency Medical Services response time, which might play a role in the time of attendance to the ED in this research.

Two studies reported in their results that the early hours of the morning and daytime were the most common time of presentation at the A&E.^{37, 41} There was one research study in Bloemfontein, South Africa, that reported the use of afterhour's services in the ED, as the most frequent time used by the patients.³

There is a speculative issue, which are reasons for patients coming after hours, like waiting time in the health facilities due to overcrowding of the Out Patients Departments or Clinics, as well as the possibility of having a relative that works and is only able to bring them to the ED during the after hours period.

5.2.2 Own perception possible time to attend or not the ED

The majority of patients answered that they were not able to attend at another time (87.5 %), therefore it was perceived by them to be the right time. This type of perception could be one of the motives that drive patients to come to ED, and to consider it as appropriate. An Australian article highlighted that this perception of justified attendance does not necessarily corresponds with the clinical interpretation of an emergency.⁴²

Different studies have used qualitative and quantitative methods to be able to demonstrate if the attendance is or not appropriate.^{3,8,13} The study by Le Roux et al, in South Africa, used a multivariable qualitative method to be able to determine the appropriateness of the attendance and concluded that majority of the attendance was inappropriate.

5.2.3 Reason for time of attendance

Forty five percent of patients in our study responded that they were coming at that particular time due to the worsening of their problems. The other 15.2 % chose to come at that time by their own choice. Some other patients responded that their problem needed hospital attention; therefore, they attended at that particular time. Other attendees said that they did not have transport available to come earlier.

Patients might perceive that it is justified to come at any time to ED, even when the nature and duration of the complaint does not justify it. A study in Taiwan has found that patients use the ED at their convenience to seek medical attention.³⁷

Some research has pointed out that the non-emergency use of ED is an important cause of over-utilization of this service in more than 70 % of situations.^{38,43} A study in London about the appropriateness of attendance to the ED describes five different reasons for attendance set out by the patients:⁸

1. Appropriateness of condition (patient feels his condition needs an ED visit),
2. Appropriating referral (patients come because they have inferred that they will be referred to ED from any other health services).
3. ED accessibility (easy to reach ED rather than other levels),
4. Other levels of care availability (GP or clinic are not available at that time),
5. Somebody else's advice to go to the ED (patients are advised by laypersons, family or peer to go to ED rather than other level).

In our study, these reasons were present as well, as part of the manifestation of a global problem related to the attendance at the ED. In the perceived need to be seen at the ED, it was found that about 45 % of the patients reported worsening of their problem and another 14 percent of patients felt that their problem needed hospital care.

The appropriating referral statement was also found in our study, as 12.4 % (Table 4.10) of the attendees reported to use the hospital ED instead of a GP or Clinic because of the assumption that they are usually referred to the hospital; therefore, it would be a waste of time to go first to these two other services.

The study did not agree with the ED accessibility statement, as majority of patients came from Khutsong location, which is farther away than the Carletonville town, and they have to use the ambulance to reach the hospital. In this matter of accessibility, the unavailability of other levels of care mainly after hours could contribute for this phenomenon.

5.2.4 Duration of the problem

In much of the research, that explored what the duration of the problem needed to be to qualify as an emergency, it appeared that traditionally a cut-off time of 72 hours was used. In Copenhagen, a study found that the majority of their patients came to the ED within 24 hours of the initiation of the problem.⁴¹

Most of the participants in our research (78.4 %) responded that their problem started within three days prior to the visit, which is considered as acceptable for an ED visit, in respect of the length of the problem. It is noted in the population that comes to Carletonville Hospital that variability in terms of help seeking behaviour might contribute to this length of illness pattern.

Other criteria are used to describe what is adequate or not for a visit to the ED: the condition itself (i.e., trauma), severity of the problem, etc.²⁷ In this study, we did not try to ascertain the appropriateness of the visit, as this was not an objective of our research and the Hospital is the main place for medical attention to the community, more especially after hours, as other levels of health care are not readily available.

A more comprehensive programme for community education might help to change the present pattern. Another author, who inferred that these kinds of programmes might reduce over-utilization of the ED, has suggested this.⁹

5.2.5 Self-rating of the severity of their problem

An important question to the participants explored the self-rating of the severity of their problems and it was intended to find out the perceived severity and indirectly the justification for attending the ED. A large number of the patients (62.0%) rated their problems as very serious. This perceived severity prompted the ED visit and in many

instances did not correlate with the clinical evaluation from the medical point of view after being triaged in the emergency department.

The literature has reported the same trend of perceived severity as a reason for attendance to the ED, even as far as 14 years ago, as it was stated in two research studies by Baker et al and Young et al in 1996. These studies concluded that an important number of patients have attended the ED because of the perceived severity of their problems; even though the triage tools has shown that they have a non-emergency problem.^{44, 45}

It is difficult to say if a visit is inappropriate, and some tools used to try to measure it have failed to prove patients perceptions wrong and even more, to reduce the risk for the patient.⁴⁶ In South Africa, there are not many validated triage tools to assess the severity of the patient's, but in Carletonville hospital, the © Cape Triage Group method has been used for more than 4 years, and it has shown to be a good tool in evaluating the need for either a prompt attention or not. There still a need for new research in this matter, to expand the use of this triages method or any other new tool.

5.2.6 Self-rating of expected service

One question that was directed to the respondents, was to find out what they were expecting from the visit to the Emergency Department, and to rate this expectation in order of their priorities. The commonest expectation was “to be examined by a doctor”. “To be helped by a nurse” was second. Other less common expectations were “to get medication”, “to be x-rayed” and “to be admitted”.

At present, there are two Clinics offering midwifery-after hour services in the Carletonville area, and not for other type of clinical problems. Therefore, if patients were coming to the ED because they wanted to be seen by a doctor, it is reasonable to think that the district Hospital will remain the main site for other after hour's medical attention for the local community, as there are no doctors visiting the Clinics after regular working hours.

It is important to know in any service delivery what the customer is coming for, and, in medical practice, this will help to prioritize the delivery to the patients. The result of this

study shows that the perceived need to be seen by a doctor, prompted many patients to attend the ED. Therefore, creating availability of doctors at other levels of care (Clinic, Primary Health Centres) will reduce the need for the patient to fulfil this need at the Hospital.

5.3 Factors Related to the System

5.3.1 Transport use

In our study we found that, 51.2% of the attendees to the ED came using the ambulance from the EMS (Emergency Medical Services). This usage disregarded whether the patient had a true emergency or not. The present policy of the EMS in our area is to bring everyone who calls them after-hours to the Hospital.

There are not trained personnel in the EMS to triage patients from the collection point, and decide if there is need or not for hospital care. This practice, which may or may not be justified in terms of political views, also plays an important role in the over usage of the ED in Carletonville Hospital.

Another explanation for calling an ambulance to come to the ED or the Hospital is that there is no public transport at night (from 8 pm until the following morning in the nearby locations), with the result that the ambulance services are used instead. It is possible that many patients do not have a transport available at the time of their need to come to the ED, and have to wait for their next of kin to arrive for work, in order to be able to reach the ED or to call an ambulance for that purpose.

One comparison with the literature revealed that in Spain, for example, only 22 % of patients came to the ED by ambulance.⁶ Another study from Iowa, USA, suggested that the EMS personnel could provide education to the community about ambulance utilization and severity of problem recognition.⁴⁷

The current situation suggest a need for expanding the availability of public transport or taxis for 24 hours service, to improve the use of EMS ambulances for emergencies cases, instead of being use for non-emergency patients to come to the ED.

5.3.2 Use of other levels of health services

A frequent question asked in the literature and by ourselves is why patients tend to come to the Hospital with non-emergency problems, even if there are other health services available. The answer, though a complicated one, nevertheless lies in the culture of the community, the health services available, and their functioning, and the needs of that community being met.

In a good health system, where physical, financial, and personnel resources are available, the community will have access to their basic health care needs, near to their homes. Therefore, the patients and families will attend a Clinic in their vicinity, and from there, they will be referred to another level of care if their problems are not dealt with at that community level. The large gap existent between the primary health care system and the other levels of care in most of South Africa is frequently filled by the district hospitals.

In this study, an important number of patients answered that they could not attend any other level of care except the hospital (79.2%), (see table 4.2). The reasons for these results are explained in the next part 5.3.4 below. Studies done in other parts of the world, with more developed health systems, have found that patients can still misuse the ED, even where General Practitioners and Clinics are available.¹³

5.3.4 Reasons for the use/non use of other levels of care

The results of this research show that “Clinic is closed” accounted for 27.6 %, of the reasons given by the participants for not attending other levels of care. This is a situation in those areas of the West Rand sub-district where there is no coverage from the primary health clinics of after hour services, and therefore the community in need for medical care has to attend the district hospital, even for non-emergency problems.

Other answers, like “Clinics always refer to the Hospital and so it is a waste of time to go there first”, is a manifestation of the self belief of the community that some patients are referred to the hospital and therefore the assumption that everyone should be able to access these services.

Another frequent reason was “the Clinic is not helpful” (19.2%). This answer may be the result of individual or collective experience from previous encounters at the clinics, with the attitude of staff, availability of resources (equipment, medical personnel and medication), that make patients believe that they do not get help. A deeper inquiry into this matter will probably bring answers that are more specific in this regard.

Analyzing other studies in different parts of the world reveals that in other places there is also a problem of patients using the ED instead of other primary levels of care. For many of those attendants, their reasons are not much different to our findings, and include “GP always refers us to Hospital”, “Clinics are not open”, and “we get better and quicker attention in ED”.^{8, 13, 27}

5.3.5 Triage colour code

Tools able to categorize patients in the ED as an emergency or not are developed everywhere in the world but few have been shown to be highly effective in predicting who has to be seen or not in the ED.

In the Carletonville Hospital ED the triage method from the ©Cape Triage Group 2005 is the main tool used to assess the severity of the patient’s problem and to indicate whether or not it needs prompt attention.

The tool is not used to decide who goes home without being seen. The current policy states: “nobody leaves without being seen” (LWBS). The literature speculates that patients who leave without being seen will probably not be satisfied with the service and be at risk of the clinical situation not being properly assessed.⁴⁸

This policy is double edged: on the one hand, if patients are seen despite not being an emergency, the satisfaction level is higher; but on the other hand, it will invite patients to use the resources available inappropriately, it will frustrate the ED personnel and will distract attention from other real emergencies, putting at risk those that needed more.⁴⁹

In this study, over 59 % of the participants were coded green, which does not require immediate attention. Yellow followed in 31.2 %, orange in 6.0 %, and red in 3.2 %, respectively. A very important finding was that many patients did not necessarily need

urgent attention, and therefore, if local Primary Health Care (PHC) Clinics were fully functioning and properly staffed, these patients could be seen at PHC level.

5.3.6 End-result of the Encounter

The result of any emergency medical service will measure the number of patients seen, discharged, and admitted. In our research, 79.2 % of the patients who participated in the study were discharged. Only 19.6 % of the total sample was admitted, and a small percentage (1.2 %) was transferred to other institutions.

Taking into consideration the end-result of the encounter, one can state that there is a need for other levels of care being available in the district and functioning optimally in order to assist patients with non-emergency problems and therefore to reduce the burden on the district hospital.

In a study done in Hong Kong, a small percentage of patients was admitted (22.0 %) while majority of the participants were discharged.⁵⁰ It could be possible that the trend internationally is the same in this regard, as judge by the result in our study.

Intensive campaigns in the adequate use of the emergency department, together with the availability of resources at the lower levels of care could possibly have an influence on the number and quality of attendees at the ED in our hospital.

CHAPTER 6

6.1 Conclusions

- The attendant at Carletonville ED is typically a male or female in the age group of 14 – 28 years, and presenting with medical problems, during afterhours services. This patient is usually brought by the EMS, and comes mostly from Khutsong location. These patients are frequently discharged from ED.
- Participants expressed several reasons for not attending other levels of care available in the district, which will be worth looking at with the purpose of making the present primary care system more attractive for patients to attend, and thereby reducing unnecessary usage of the hospital ED.
- The triage system used at present in the ED provides a good tool to assess severity of the patient's condition and for deciding the need for prompt attention or not.

6.2 Recommendations

1. It is necessary to strengthen the local primary health system, with medical personnel and other resources to be able to satisfy the demands in the area, attract patients to the service, and relieve the burden of the District Hospital.
2. There is a need for comprehensive education of the local community and civil society in the appropriate use of the ED and in the use of other local health resources like Clinics and General Practitioners.
3. Further studies are required to identify, in depth, other components of the pattern of attendance, like appropriateness, and the help seeking behaviour of the local community.

APPENDICES

APPENDIX A

INFORMATION ABOUT THE PURPOSE OF THE RESEARCH

Date of the research: April to August 2009

Title of the research: Factors contributing to the pattern of attendance of patients to the Emergency Department (ED) at Carletonville District Hospital.

Dear patient, parent, or accompanying person

I, Dr. Misael Fernandez Silva, am a student in the Family Medicine Department at the University of the Witwatersrand. Herewith I am inviting you to participate in my research project, which is about the usage of the ED at Carletonville Hospital. In this study, I would like to get information from you and other patients, about the type of patients that are attended to here, the reasons and the time arriving at the emergency department. The Hospital Manager and the Family Medicine Department at University of Witwatersrand in Johannesburg have approved this research.

I will appreciate your participation and your help in completing the questionnaire I will ask you questions and your answers will be known only to me as the researcher. Your answers will in no way affect the quality of the service that will be given to you today in this facility. There will however be a slight delay while you complete the questionnaire. I will make sure that you keep your place in the queue, and in case you lose it, I will arrange for you to be seen immediately after completing the questionnaire, to minimize any inconveniences.

The time you will spend in answering this question will be approximately 10 minutes or less, and this will take place in a private area if you need any help or clarification regarding the questions, I will be immediately available.

The final results of the research will be presented to the University of Witwatersrand, and to the Hospital Manager, but if your are interested in any aspect of this research or the

results you are more than welcome to contact me on the numbers and other contact details supplied below.

If you are clear about the purpose of this research and are willing to take part, please sign the consent form. You are however not obliged to take part if you do not wish to do so.

I appreciate and thank you for your precious time.

Dr. Misael Fernandez Silva (Student)
Family Medicine Department
University of the Witwatersrand
Cell: 0828248139 / e-mail msilva@worldonline.co.za

APPENDIX B

Consent Form

I _____

(Patient/ a next of kin, guardian/ parent/accompanier)

Attending the Emergency Department at Carletonville Hospital, herewith consent / do not consent to take part in the research conducted by Dr. Misael Fernandez Silva.

_____ (Signature)

Date: / / /

APPENDIX C

Questionnaire

(This is a confidential document)

Questionnaire Number ____ (for official use only).

Please tick the appropriate boxes

1. Male Female
2. How old are you in years? _____ (or months if a child _____)
3. Do you work? Yes No (tick the appropriate one)
4. Where are you living? (Your Physical Address):
5. What problem made you come to the hospital today?
(Describe in your own words or patient's words) (*Example: I am coughing up blood*)

6. How long have you being suffering from this problem (days, months, etc):

7. What made you decide to come at this particular time?

8. Do you think you could have come at another time? : Yes NO
(give reasons for your answer) (*Example: yes, on Monday, etc*)

9. What type of transport did you use to come to the hospital?

Private public ambulance

10. Is there any other reason besides your sickness that made you to use the casualty department today: Yes No (Please explain if yes):

11. Do you think your problem could be managed at your local Clinic or General Practitioner?. Yes No (Please explain)

12. Do you consider your problem today to be

Very serious Serious not very serious, but needs attention

not serious at all

13. What do you expect from the Hospital today?. You can tick more than one. Please state on top of each block selected the priority order i.e. 1

Medication Blood tests To be examined and helped by a doctor

To be helped by a nurse An X-ray To be admitted

To have a cause for the illness found health education

Counseling

A referral to another hospital or health service e.g. psychologist or physiotherapist

To get a drip

Other Please specify

Thank you for your time

APPENDIX D

LETTER OF APPROVAL FORM HOSPITAL C.E.O



HEALTH

Department:
Health
NORTH WEST PROVINCE



All correspondence to be addressed to:
The Chief Executive Officer
Carletonville Hospital Complex
Private Bag x 2023
Carletonville
2500

OFFICE OF THE C.E.O CARLETONVILLE HOSPITAL

TEL: (018) 788 1701
Fax: (018) 788 2726
788 4120

01 - 04 - 08
Dr. M. Fernandez Silva
Carletonville hospital
Private bag X2023
Carletonville
2500

Dear Dr. Silva

RE: PERMISSION TO CONDUCT A RESEARCH IN CASUALTY DEPARTMENT

1. Your letter dated 31-03-08 refers.
2. Permission is granted to you to conduct a research in casualty department subject to approval of Human Research Council Ethical committee.
3. I wish you success in your research.

Yours sincerely

M.G. Motloung
CEO
Carletonville Hospital

APPENDIX E

LETTER OF APPROVAL FORM ED HEAD OF UNIT

Carletonville Hospital
Casualty Department

To Dr Silva

Re: Permission to do Research in Casualty.

Permission is hereby granted to Dr. Silva to do his research in Casualty Department. I hope you will find this in order.

Thank You



SPN E.J. HUGHES
06/04/08

APPENDIX F

LETTER OF APPROVAL FROM THE FACULTY



Faculty of Health Sciences
Medical School, 7 York Road, Parktown, 2193
Fax: (011) 717-2119
Tel: (011) 717-2745

Reference: Ms Tania Van Leeve
E-mail: tania.vanleeve@wits.ac.za
22 July 2008
Person No: 0616127A
PAG

Dr M Fernandez Silva
P O Box 1128
Carltonville
2500
South Africa

Dear Dr Fernandez Silva

Master of Family Medicine: Approval of Title

We have pleasure in advising that your proposal entitled "*Factors contributing to the pattern of attendance of patients as the Emergency Department (ED) at Carletonville hospital*" has been approved. Please note that any amendments to this title have to be endorsed by the Faculty's higher degrees committee and formally approved.

Yours sincerely

A handwritten signature in black ink, appearing to read "S Benn". Below the signature is a short horizontal line.

Mrs Sandra Benn
Faculty Registrar
Faculty of Health Sciences

APPENDIX G

LETTER OF APPROVAL FROM THE ETHICS COMMITTEE

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

Division of the Deputy Registrar (Research)

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

R14/49 Silva

CLEARANCE CERTIFICATE

PROTOCOL NUMBER M080547

PROJECT

Factors contributing to the pattern of attendance of patients at the Emergency Department at Carletonville Hospital

INVESTIGATORS

Dr MF Silva

DEPARTMENT

Family Medicine

DATE CONSIDERED

08.05.30

DECISION OF THE COMMITTEE*

Approved unconditionally

+

Unless otherwise specified this ethical clearance is valid for 5 years and may be renewed upon application.

DATE 08.06.11

CHAIRPERSON



(Professor P E Cleaton Jones)

*Guidelines for written 'informed consent' attached where applicable

cc: Supervisor : Dr C van Deventer

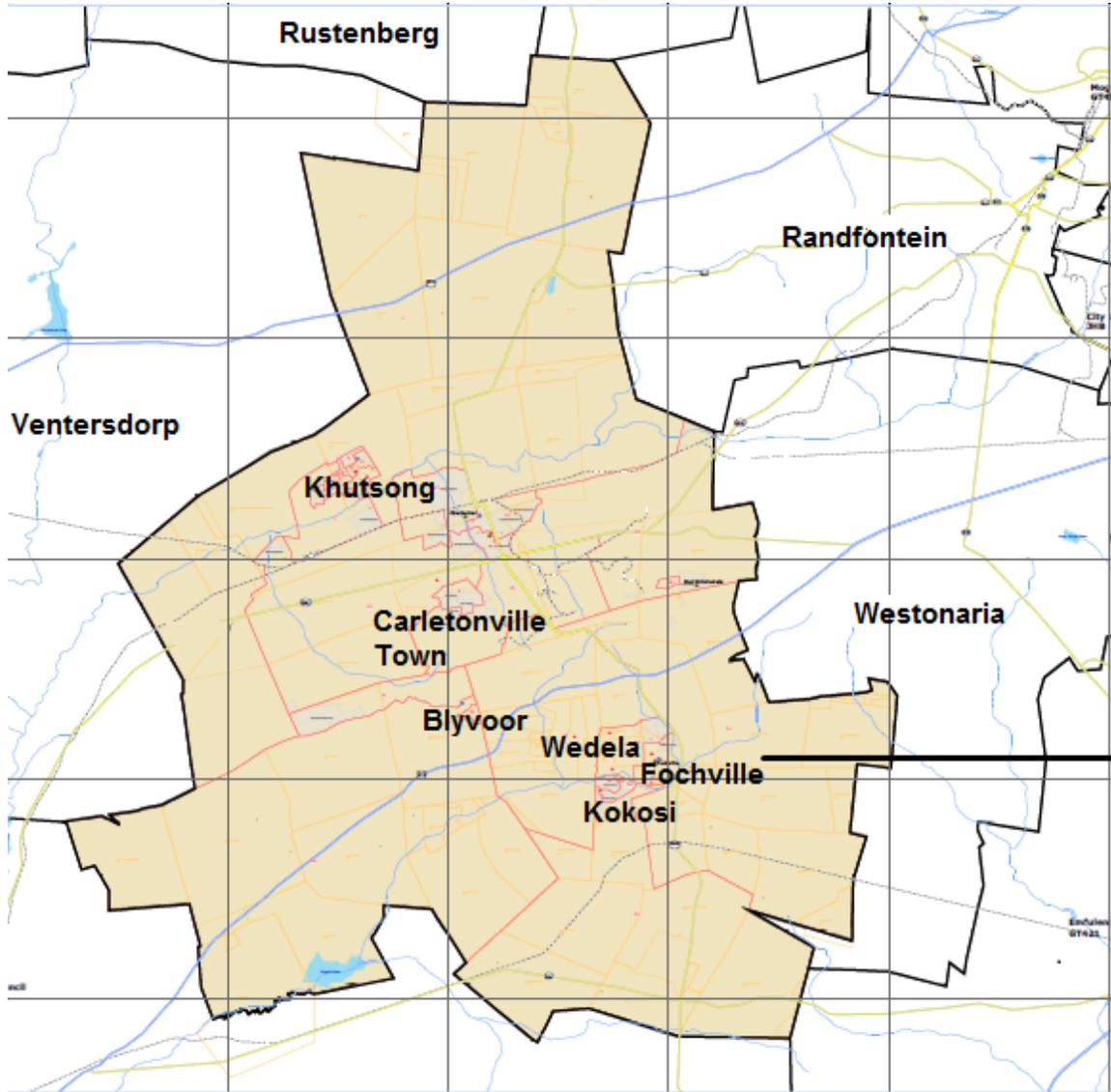
DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10004, 10th Floor, Senate House, University.
I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. **I agree to a completion of a yearly progress report.**

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

APPENDIX H

MERAFONG CITY DEMARCATION MAP



REFERENCES

- ¹ Olshaker JS. Managing emergency department overcrowding. *Emerg Med Clin North Am.* 2009 Nov;27(4):593-603, viii.
- ² Moskop JC, Sklar DP, Geiderman JM, Schears RM, Bookman KJ. Emergency department crowding, part 1--concept, causes, and moral consequences. *Ann Emerg Med.* 2009 May;53(5):605-11. Epub 2008 Nov 22.
- ³ Le Roux L , Nel M, Van Vuuren MVJ, Rabie WJ. The appropriateness of patients' visits to an emergency department. [Die toepaslikheid van pasiënt besoeke aan 'n noodgevalle eenheid]. *Manag Care.* 2006 Jun;15(6):54-9.
- ⁴ Pontso H Monese, Engela AM Prinsloo, Francois C van Rooyen. Injuries in children and adolescents seen during 2006 at the emergency department of the National District Hospital, Bloemfontein. *South African Family Practice*, Vol 53, No 1 - January/February 2011.
- ⁵ Nkombua L. The practice of medicine at a district hospital emergency room: Middelburg Hospital, Mpumalanga Province. *SA Fam Pract* 2008;50(1):65
- ⁶ Llorente Alva rez S, Alonso Fernandez M, Buznego Alvarez B. Role of primary care in the frequent attendance to the emergency service of a county hospital. *Aten Primaria.* 1996 Sep 30;18(5):243-7.
- ⁷ Escobedo F, Gonzalez Gil L, Salarichs M, Manzano A, Lopez I, Martin JA, Albaladejo C. Evaluation of hospital emergency service attendance by patients from a basic health district. *Aten Primaria.* 1997 Mar 15;19(4):169-75.
- ⁸ Murphy AW. 'Inappropriate' attenders at accident and emergency departments I: definition, incidence and reasons for attendance. *Fam Pract.* 1998 Feb;15(1):23-32.
- ⁹ Hull SA, Jones IR, Moser K. Factors influencing the attendance rate at accident and emergency departments in East London: the contributions of practice organization, population characteristics and distance. *J Health Serv Res Policy.* 1997 Jan;2(1):6-13.

-
- ¹⁰ Millenium Development Goals: Country Report 2010. Available from URL: http://www.statssa.gov.za/news_archive/Docs/MDGR_2010.pdf. [Accessed February 6, 2011]
- ¹¹ United Nation Children Fund Report by Country. Available in URL: http://www.unicef.org/infobycountry/southafrica_statistics.html#79. [Accessed February 5, 2011]
- ¹² Rajpar SF, Smith MA, Cooke MW. Study of choice between accident and emergency departments and general practice centres for out of hours primary care problems. *J Accid Emerg Med*. 2000 Jan;17(1):18-21.
- ¹³ Davison AG, Hildrey AC, Floyer MA. Use and misuse of an accident and emergency department in the East End of London. *J R Soc Med*. 1983 Jan;76(1):37-40.
- ¹⁴ Blank FS, Li H, Henneman PL, Smithline HA, Santoro JS, Provost D, et al. A descriptive study of heavy emergency department users at an academic emergency department reveals heavy ED users have better access to care than average users. *J Emerg Nurs*. 2005 Apr;31(2):139-44.
- ¹⁵ Rask KJ, Williams MV, McNagny SE, Parker RM, Baker DW. Ambulatory health care use by patients in a public hospital emergency department. *J Gen Intern Med*. 1998 Sep;13(9):614-20.
- ¹⁶ Downing A, Wilson R. Temporal and demographic variations in attendance at accident and emergency departments. *Emerg Med J*. 2002 Nov;19(6):531-5.
- ¹⁷ Walls CA, Rhodes KV, Kennedy JJ. The emergency department as usual source of medical care: estimates from the 1998 National Health Interview Survey. *Acad Emerg Med*. 2002 Nov;9(11):1140-5.
- ¹⁸ Dove AF, Dave SH. Elderly patients in the accident department and their problems. *Br Med J (Clin Res Ed)*. 1986 Mar 22;292(6523):807-9.

-
- ¹⁹ Philips H, Remmen R, De Paepe P, Buylaert W, Van Royen P. Out of hours care: a profile analysis of patients attending the emergency department and the general practitioner on call. *BMC Fam Pract.* 2010 Nov 15;11:88.
- ²⁰ Ruger JP, Richter CJ, Spitznagel EL, Lewis LM. Analysis of costs, length of stay, and utilization of emergency department services by frequent users: implications for health policy. *Acad Emerg Med.* 2004 Dec;11(12):1311-7.
- ²¹ Hider P, Lay-Yee R, Davis P. Practitioners, patients, and their visits: a description of accident and medical (A&M) clinics in New Zealand, 2001/2. *N Z Med J.* 2007 May 18;120(1254):U2538.
- ²² Rasmussen SW, Svendsen RN, Gringer K. Attendance pattern at an open casualty ward in Greater Copenhagen. *Ugeskr Laeger.* 1997 Nov 10;159(46):6831-4.
- ²³ Tsai JC, Liang YW, Pearson WS. Utilization of emergency department in patients with non-urgent medical problems: patient preference and emergency department convenience. *J Formos Med Assoc.* 2010 Jul;109(7):533-42.
- ²⁴ Washington DL, Stevens CD, Shekelle PG, Baker DW, Fink A, Brook RH. Safely directing patients to appropriate levels of care: guideline-driven triage in the emergency service. *Ann Emerg Med.* 2000 Jul;36(1):15-22.
- ²⁵ McCaig LF, Burt CW. National Hospital Ambulatory Medical Care Survey: 1999 emergency department summary. *Adv Data.* 2001 Jun 25;(320):1-34.
- ²⁶ Lowe RA, Bindman AB, Ulrich SK, Norman G, Scaletta TA, Keane D, Washington D, Grumbach K. Refusing care to emergency department of patients: evaluation of published triage guidelines. *Ann Emerg Med.* 1994 Feb;23(2):377-9.
- ²⁷ Williams K. Who uses the accident service?. *Injury.* 1984 Jul;16(1):35-7
- ²⁸ Andersen NA, Gaudry PL. Patients attending an accident and emergency department for primary medical care. *Fam Pract.* 1984 Jun;1(2):79-85

-
- ²⁹ World Health Statistics 2009. Available on URL:
http://www.who.int/whosis/whostat/EN_WHS09_Full.pdf . [Accessed February 4, 2011]
- ³⁰ Walls CA, Rhodes KV, Kennedy JJ. The emergency department as usual source of medical care: estimates from the 1998 National Health Interview Survey. *Acad Emerg Med*. 2002 Nov;9(11):1140-5.
- ³¹ Bryce GM, Houghton JD. Out-of-district attenders: the passing trade of an accident and emergency department. *Archives of Emergency Medicine*, 1993, 10, 172-176.
- ³² Siddiqui S, Ogbeide DO. Utilization of emergency services in a community hospital. *Saudi Med J*. 2002 Jan;23(1):69-72.
- ³³ Jones CS, McGowan A. Self referral to an accident and emergency department for another opinion. *BMJ*. 1989 Apr 1;298(6677):859-62.
- ³⁴ What is the legal working age in South Africa. Available on URL:
http://www.law24.com/index.php?option=com_experts&view=question&qid=1526&Itemid=104. [Accessed June 25, 2010]
- ³⁵ Statistics South Africa. Statsonline. Available on URL:
<http://www.statssa.gov.za/keyindicators/keyindicators.asp>. [Accessed March 18, 2010]
- ³⁶ Statistics South Africa. Statsonline. Available on URL:
<http://www.statssa.gov.za/PublicationsHTML/P02114thQuarter2009/html/P02114thQuarter2009.html>. [Accessed March 18, 2010]
- ³⁷ Tsai JC, Liang YW, Pearson WS. Utilization of emergency department in patients with non-urgent medical problems: patient preference and emergency department convenience. *J Formos Med Assoc*. 2010 Jul;109(7):533-42.

³⁸ Gentile S, Durand AC, Vignally P, Sambuc R, Gerbeaux P. Do non-urgent patients presenting to an emergency department agree with a reorientation towards an alternative care department? *Rev Epidemiol Sante Publique*. 2009 Feb;57(1):3-9. Epub 2009 Jan 21.

³⁹ United Nations 2009 world AIDS epidemic update. Available at URL: http://www.unaids.org/en/media/unaids/contentassets/dataimport/pub/report/2009/jc1700_epi_update_2009_en.pdf. . [Accessed March 23, 2011]

⁴⁰ The AID plan. Available from URL: <http://www.doh.gov.za/aids/docs/aids-plan/intro.pdf>. [Accessed March 23, 2011]

⁴¹ Rasmussen SW, Svendsen RN, Gringer K. Attendance pattern at an open casualty ward in Greater Copenhagen. *Ugeskr Laeger*. 1997 Nov 10;159(46):6831-4.

⁴² Callen JL, Blundell L, Prgomet M. Emergency department use in a rural Australian setting: are the factors prompting attendance appropriate?. : *Aust Health Rev*. 2008 Nov;32(4):710-20.

⁴³ Law CK, Yip PS. Acute care service utilisation and the possible impacts of a user-fee policy in Hong Kong. *Hong Kong Med J*. 2002 Oct;8(5):348-53.

⁴⁴ Baker DW, Stevens CD, Brook RH. Regular source of ambulatory care and medical care utilization by patients presenting to a public hospital emergency department. *JAMA*. 1994 Jun 22-29;271(24):1909-12.

⁴⁵ Young GP, Wagner MB, Kellermann AL, Ellis J, Bouley D. Ambulatory visits to hospital emergency departments. Patterns and reasons for use. 24 Hours in the ED Study Group. *JAMA*. 1996 Aug 14;276(6):460-5.

⁴⁶ Driscoll PA, Vincent CA, Wilkinson M. The use of the accident and emergency department. *Arch Emerg Med*. 1987 Jun;4(2):77-82.

⁴⁷ Young T, Torner JC, Sihler KC, Hansen AR, Peek-Asa C, Zwerling C. Factors associated with mode of transport to acute care hospitals in rural communities. *J Emerg Med.* 2003 Feb;24(2):189-98.

⁴⁸ Kennedy M, MacBean CE, Brand C, Sundararajan V, McD Taylor D. Review article: leaving the emergency department without being seen. *Emerg Med Australas.* 2008 Aug;20(4):306-13.

⁴⁹ Selasawati HG, Naing L, Wan Aasim WA, Winn T, Rusli BN. Inappropriate utilization of emergency department services in Universiti Sains Malaysia hospital. *Med J Malaysia.* 2004 Mar;59(1):26-33.

⁵⁰ Law CK, Yip PS. Acute care service utilisation and the possible impacts of a user-fee policy in Hong Kong. *Hong Kong Med J.* 2002 Oct;8(5):348-53.