CHAPTER 4

Data analysis and findings

4.1 INTRODUCTION

This chapter discusses the data analysis and findings of the study. The questionnaire used in this retrospective study was carefully analysed to ensure that the data gathered was presented clearly with the aid of tables, percentages and graphs, where possible. A retrospective chart analysis was conducted to capture the data essential to accomplish the research objectives.

The overall aim of this study was to determine the extent of the delays facing the patient with AMI at this hospital from time of arrival till the thrombolytic agent was administered. The time to thrombolyse was also analysed and presented, taking into consideration the recommendations of the National Heart Attack Alert Program (NHAAP) (1994:312) of "thrombolysis within 30 minutes of arrival" at the hospital. In addition, the overall management of the patient suffering from MI was audited for continuous quality improvement at the Al Ain Hospital.

The questionnaire comprised four sections with a total of 54 structured closed questions that were developed to ensure rigour and objectivity of data.

SECTION A

This section contained 11 questions and comprised the following sections:

1 Demographic data
2 Time of arrival
3 Date
4 Method of arrival
5 Call for ambulance

6 Response to the call for the ambulance

SECTION B

This section contained 4 questions and comprised the following sections:

1 Past medical and surgical history of patient
2 History of smoking and alcohol as risk factors

SECTION C

This section contained 17 questions and comprised the following sections:

1 Date and time of the onset of symptoms
2 The location, duration and severity of pain, radiating to; whether accompanied by any associated symptoms; and the measures used to relieve the pain
3 The activity the patient was involved in and the location where the patient was at the onset of the symptoms

SECTION D

This section contained 22 questions and comprised the following sections:

1 Assessment in triage area and disposal thereof by nurse
2 The time of collection of data, namely the ECG and history taking
3 The time the first doctor in the accident and emergency unit attended to the patient
4 The time the doctor made the diagnosis
5 Referral made
6 The time the physician attended to the patient
7 The time the decision was made to thrombolyse
8 The doctor who made the decision to thrombolyse
9 The time taken to make the decision to thrombolyse

10 The time and type of drug given, the time taken to administer the drug and the area where the agent was delivered and the unit where the patient was admitted

In this section an attempt was made to identify the delays the patient faced from arrival until the drug was administered. Consideration was given to the recommendation of the NHAAP (1994:312) regarding the 4 D's, namely door, data, decision-making and drug administration.

The following aspects were given consideration in the final analysis:

1 The time the ECG was obtained and whether it was within 10 minutes as recommended by the AHA and the ACC (Antman et al 2004a:678)
2 The delays between each significant point, i.e., door, data collection and analysis, decision-making, and the drug administration time
3 The door-to-needle time
4 The symptom-to-door time
5 The symptom-to-needle time

4.2 DATA COLLECTION

Initially, 457 files numbers were identified from the admission log books of the coronary care and intensive care units. However, during the file review it was discovered that 109 of the file numbers were duplicated and subsequently eliminated from the study. The reason was that, although cardiac admission are primarily sent to the coronary care unit, it does on occasion become essential to admit the patients to the intensive care unit when a shortage of bed space is experienced. As soon as a bed becomes available, the patients are shifted to the coronary care unit.

The remaining 27 files were not accessible and were reported as either deceased or unavailable for review, although 3 files of deceased patients were included, hence only 321 files were included in this study.

The data was gathered in the filing section by the researcher, using the structured instrument and entered into the excel sheet on the computer provided by the statistician for the 321 patients. This information was protected by a secret password, to which only the researcher had access.

4.3 DATA ANALYSIS

The data captured from all 321 files was subjected to computer analysis, with the assistance of a professional statistician, and converted into percentages and collated in the form of tables, graphs and figures to make the data presentation meaningful. The data was analysed according to the research questions posed earlier in the study.

4.3.1 Section A: Demographic data

In this section, the gender distribution, age distribution, nationality and occupation of the research population is discussed.

4.3.1.1 Gender distribution

The gender distribution of the subjects is depicted in figure 4.1.

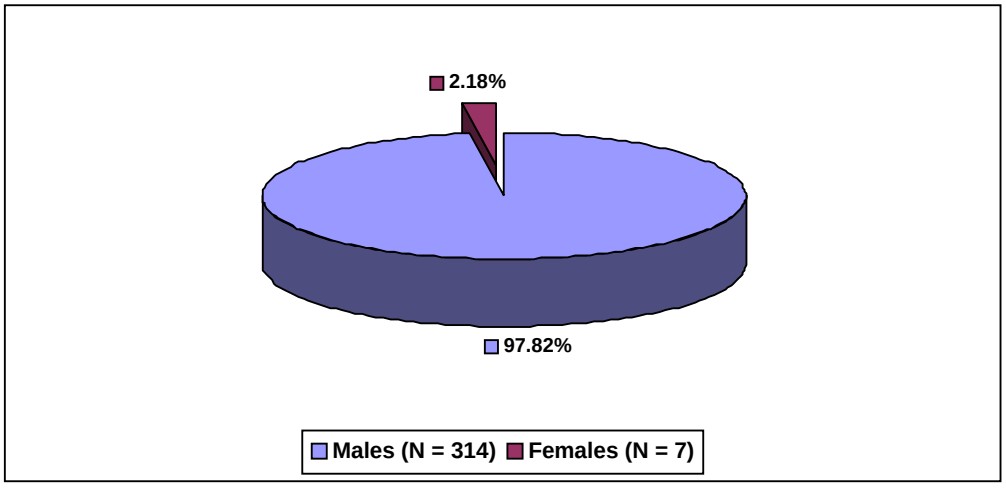

Figure 4.1

Gender distribution (N = 321)

According to the findings, more than 97,00% of the subjects under investigation were males, indicating that males are a higher susceptible gender to AMI than the women, who accounted for only 2,18% of the sample.

This is consistent with studies carried out in Spain by Ruiz-Balen, Aguayo-de-Hoyos, Corcoles-Serrano, Diaz-Castalleno, Ramos-Cuadra and Reina-Toral (2001:1050) where it was found that patients admitted to accident and emergency units suffering from AMI consisted of 77,25% males; and in Kuwait studies conducted by Zubaid and Rashed (2001:115) revealed 85% males. In San Francisco, Lambrew et al (1997:2577) found 78% to be males who suffered from AMI. No reasons were provided for these independent study profiles. The researcher is of the opinion that in the UAE, the predominantly male figures could be attributed to the fact that the population in the UAE is composed largely of foreign males from other countries, or "expatriates", who form a large portion of the workforce and it is these males who work under adverse circumstances (see description in chapter 1).

4.3.1.2 Age distribution

Figure 4.2 depicts the age distribution of the research population affected by AMI.

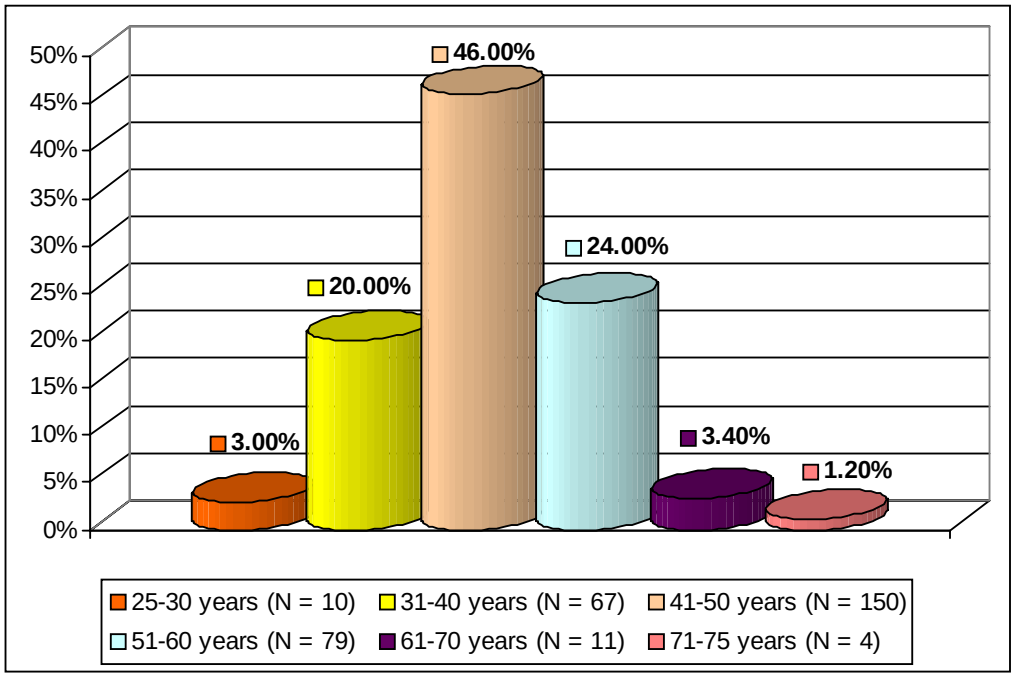

Figure 4.2

Age distributions (N = 321)

The majority of the cases presented 46,00% were in the age group 41-50 years, followed by 24,00% in the 51-60 age group and 20,00% in the 31-40 year age group. Only 3.00% of the subjects were in the age group 25-30 years. The minimum age found in this study of a person who suffered an AMI was 25 and the maximum was 72 years. The mean was 46,9 years of age.

This is consistent with the findings of Zubaid and Rashed (2001:116) who report that 63,00% of the population studied were below 55 years of age. Mitka (2004:2533) states that ischaemic heart disease is increasing in developing countries and is projected to increase by 137,00% for the younger population. Mitka (2004:2533) also reports that the Director-General of the WHO declared that "cardiovascular disease in prime labor years in developing countries will exceed that of the industrialized nations".

4.3.1.3 Nationality

In table 4.1 the nationality of the patients suffering from AMI and admitted to the accident and emergency unit of the Al Ain hospital in the UAE is reflected.

Table 4.1 Nationality

NATIONALITY	N	PERCENTAGE
Afghanistan	2	0,62
Bengalis	68	21,18
Egyptian	16	4,98
Indian	93	28,97
Iranian	3	0,93
Iraqi	3	0,93
Indonesian	1	0,31
Jordan	10	3,12
Lebanese	4	1,25
Omanese	7	2,18
Pakistani	71	22,12
Sudanese	8	2,49
Somalian	2	0,62
SriLankan	1	0,31
Senegalese	1	0,31
Saudi Arabian	2	0,62
Syrian	9	2,80
UAE	20	6,23
TOTAL	321	100,00

The sample selected comprised 18 nationalities who presented for treatment at the Al Ain Hospital from January 2002 to December 2003, as shown in table 4.1.

The highest number of individuals admitted to the accident and emergency unit were of Indian origin (28,97%), Bangladeshi (21,18%) and Pakistani (22,12%).

As discussed in chapter 1, male workers from the South Asia Pacific region, including Filipinos, Bangladeshi, Indians and Pakistanis, and also Arab nationals from Egypt, Iran, Yemen, Jordan, Syria, Lebanon and Tunisia make up a large portion of the workforce, and the majority of these workers are single males with some having families in their own countries to support. Approximately 90,00% of these men form the labour force in the UAE.

The findings are consistent with Yang et al's (2002:385) finding at the London Chest Hospital that "patients of South Asian origin have an increased incidence of premature coronary artery disease and this should be considered a major risk factor in its own right".

It is also noteworthy that only 6,23% were UAE nationals, confirming the minority of the Emerati population in comparison with the other nationalities.

4.3.1.4 Occupation

The subjects' occupation is indicated in table 4.2.

Table 4.2 Occupation

TYPES OF EMPLOYMENT	N	PERCENTAGE
Drivers	58	18,06
Engineers	10	3,11
Labourers	172	53,58
Miscellaneous	22	6,85
Retired	13	3,74
Sales/business management	19	5,90
Teachers	6	1,87
Unemployed	11	3,42
Unknown	10	3,11
TOTAL	321	100,00

Difficulties were encountered in this category, mainly due to poor documentation of history-taking, as mentioned earlier in the study. The population studied was made up of either skilled or unskilled labourers, of whom 3,00% were not documented and therefore grouped into the category "unknown". However, it was found that 1,87% were teachers, 5,90% were in sales and management, 3,12% were engineers, 3,42% were unemployed, 3,74% were retired males, 18,06% were drivers, which included ambulance, bus, heavy-duty vehicles, taxi drivers and personal drivers for the UAE nationals. The largest population of AMI sufferers fell into the category of labourer.

The information provided in the files of these patients was deficient in this aspect, mainly due to poor documentation. Some doctors identified clearly the type of work the patient was in while many ignored this aspect, and thus all other unskilled workers were termed “labourers”. The unskilled labourers accounted for a large portion of the cases studied, namely 53,58%, and among them were cleaners, camel-milkers and herders, housemaids, gardeners, restaurant workers, cooks and other unskilled workers. In a large percentage of cases, the patients are exposed to harsh weather conditions, including poor dietary intake, lack of exercise, indulgence in smoking, psychosocial-economic pressures and the inability to secure medical assistance for conditions that predispose to AMI.

Section A-2 and A-3

This section contains questions about the time of arrival of the patient at the accident and emergency unit of the Al Ain hospital.

4.3.1.5 Date and time of arrival

The date and time of arrival was varied and the delays between time of arrival to the other areas significant in this section. The delays between the 4 D’s, i.e. the points between the door ,data, decision-making and drug administration time (see chapter 1) was analysed and is presented later in this chapter.

Section A-4 Method of arrival

In this section the accompaniment of the patient and the mode of arrival are discussed.

4.3.1.6 Accompanied

Family support is strongly demonstrated in this country, especially when members of the family take ill. Patients are mostly accompanied by their family members when they live together. However, in many cases the family are not with the patient and they are accompanied by friends and co-workers.

This study reveals that almost 44,24% were accompanied by either friends and colleagues and a further 7,48% were unaccompanied, indicating that a large portion of the patients (31,73%) had little or no family support in this country due to their work obligations. Almost 30,53% were accompanied by relatives and 14,33% were accompanied by doctors and nurses from either the primary health care facilities or surrounding private hospitals. Members of the police department accompanied 1,87% of cases and the remaining 1,56% were not documented and were classified as unknown.

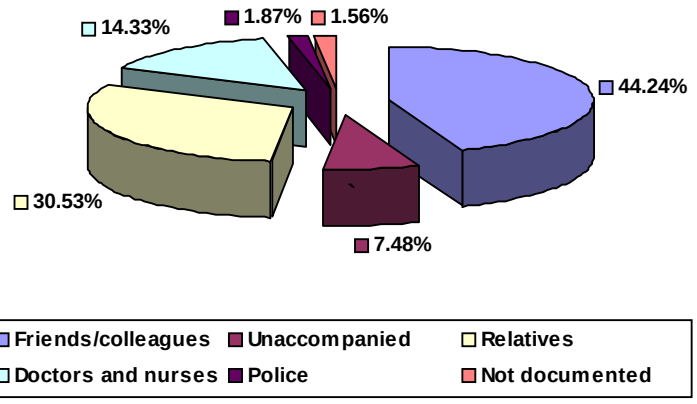

Figure 4.3

Accompaniment of patient (N = 321)

4.3.1.7 Mode of arrival at hospital

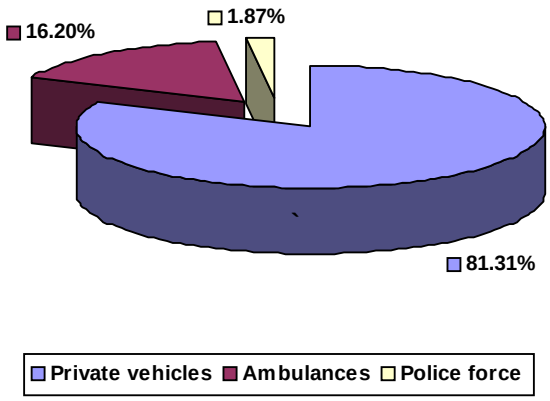

Figure 4.4

Mode of arrival at hospital (N = 321)

The majority of the patients, 81,31%, arrived by private vehicles whilst 16,20% came in by ambulances either from the surrounding hospitals or PHC and 1,87% were escorted by members of the police force.

4.3.1.8 Sections A-5 and A-6 Call for ambulance and response to the call for the ambulance

This section addresses the time of summoning of "help" and arrival of the "help". It is apparent from the records that little attention was given to this aspect as no documentation was found in any of the files with regard to transport by ambulance services and no documentation present to indicate whether help was requested or not. This aspect needs to be further explored, and discussed at higher administrative and management levels before any decision or recommendations can be made.

4.3.2 Section B

This section contained the past medical and surgical history of the patient as well as the history of smoking.

4.3.2.1 Past medical and surgical history

The past medical history as obtained from the patient records is reflected in figure 4.5.

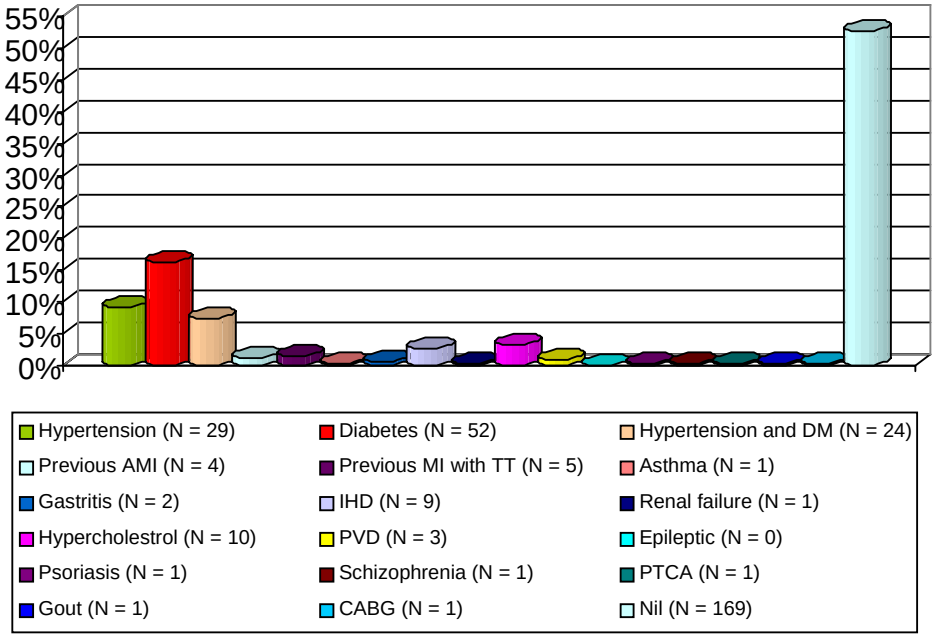

Figure 4.5

Medical history (N = 321)

Keys:
MI: Myocardial Infarction
TT: Thrombolythic therapy
IHD: Ischaemic heart disease
PVD: Peripheral Vascular disease
CABG: Coronary artery bypass graft
DM: Diabetes mellitus
PTCA: Percutaneous transcutaneous coronary angiography

The past medical history of the patients revealed most significantly that more than 53,00% did not have any previously recorded medical history of cardio-vascular disease or any of the risk factors associated with AMI.

From figure 4.5 it is also evident that diabetis, those suffering from both hypertension as well as diabetis mellitus, hypercholesterol and IHD played the most significant roles in the medical history of the patients admitted with AMI

Only 1,60% of the patients were reported with a history of previous MI with TT and those with PVD showed 0,96% while those suffering from gastritis showed a total of 0,64%. Patients with a history of a previous AMI were 1,28%. Other previous medical history was insignificant and only 0,32% of patients reported with psoriasis, gout, schizophrenia, CABG, asthma, renal failure and PTCA. None were found to present with a history of asthma.

Crawford (2003:531) states that coronary artery disease is two or three times more prevalent in diabetics than non-diabetics and adds that hypertension is also identified as a major modifiable risk factor for coronary artery disease. In a study carried out in Germany over a thirteen-year period, Heidrich, Wellman, Hense, Siebert, Liese, Lowel and Kiel (2003:445) confirmed that the risk factors for myocardial infarction include hypertension, diabetes and smoking.

Sebastian (2004:1) from the Welcare Hospital in Dubai of the Emirates also states, in his presentation at the Faculty of Medicine in Al Ain, that cardiovascular diseases are more prevalent in diabetic than non-diabetic patients.

4.3.2.2 Modifiable risk factors for MI

Figure 4.6 presents a summary of the modifiable risk factors for MI as found in this study. More than 52% of the patients did not have any previous medical problems, 47.35% reported previous attacks of ischaemic heart disease, 32,7% reported DM and HT while only 5.6% had one or more medical conditions and hyperlipidaemia.

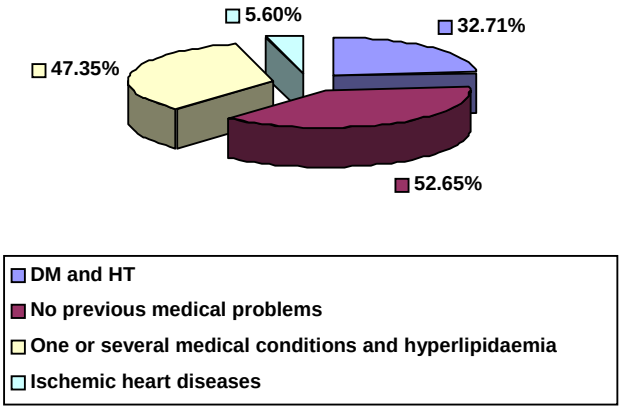

Figure 4.6

Modifiable risk factors for myocardial infarction (N = 321)

These findings can be compared to those of Yusuf, Flather, Pogue, Hunt, Varigos, Piegas, Avezum, Anderson, Keltai, Budaj, Fox, and Ceremuzynski, (2004:937) who report from their study conducted in over 52 countries and in almost all the continents of the world that abnormal lipids, hypertension, diabetes and psychosocial factors, among others, are modifiable risk factors for MI. These findings are consistent with the results of this research that 32,71% of the patients presented with DM, HT or both as an underlying condition.

4.3.2.3 Smoking and alcohol use

Figure 4.7 indicates the percentages of those who smoked, ex-smokers as well as naswar chewers.

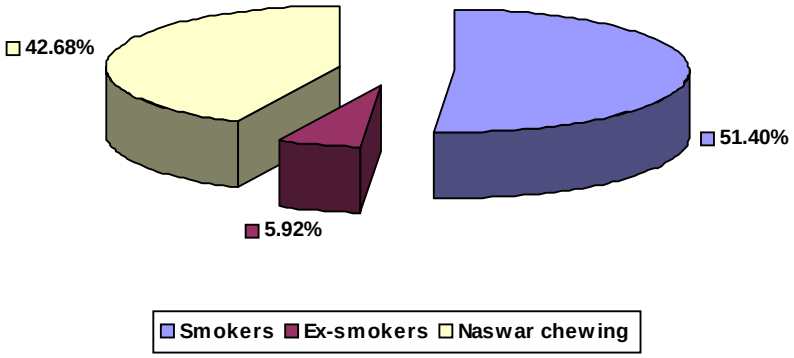

Figure 4.7

Smoking as risk factor (N = 321)

Smoking is a risk factors for AMI (Yusuf et al 2004:937) and according to Heidrich et al (2003:445), heavy smokers have a particularly high risk for MI. In this study, 51,40% were smokers and 5,92% were ex-smokers. In addition to cigarette smoking, there were several who were reported smoking or chewing a substance named *Naswar. Naswar* is a type of tobacco used by some Pakistani nationals. This is regarded as having the same risk factor as tobacco smoking, according to an expert cardiologist consulted at the Al Ain Hospital.

Figure 4.8 depicts the number of patients who use alcohol.

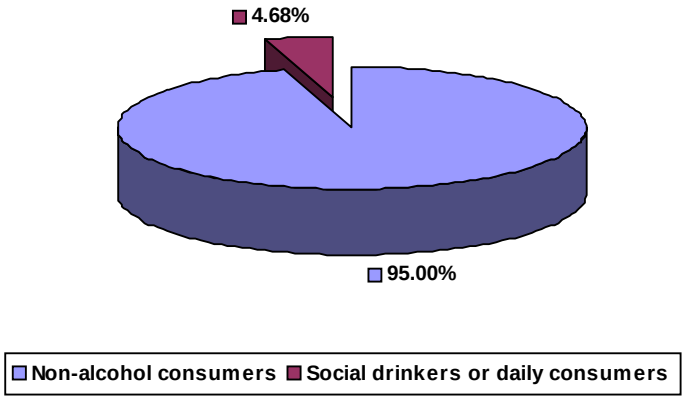

Figure 4.8

Alcohol use as risk factor (N = 321)

In this study, 95,00% were reported as non-alcohol consumers and this may be due to several factors in this country. The trade of alcohol is not freely permitted and a licence is required to purchase alcoholic beverages. A further 4,68% were found to be either social drinkers or daily consumers of alcoholic beverages. None were reported as alcohol abusers. Studies conducted independently revealed that moderate alcohol intake did not contribute to cardiovascular diseases (Jeanne, Tofferi, Taylor, Feuerstein & O'Malley 2004:148). Gaziano, Hennekens, Godfriend, Sesso, Glynn, Breslow and Buring (1998:52) also report from their study in the USA, that moderate intake of either wine, beer and other liquor actually increased the high density lipoprotein (HDL) to provide the essential protection against angina and myocardial infarction in apparently healthy men.

4.3.3 Section C

This section addresses the "current condition" of the patient. This is the period immediately after the onset of pain and includes the following characteristics: the immediate medical condition of the patient, the date and time of symptom onset, the location of the pain, the severity of the pain, whether the pain radiated to other areas, related symptom onset, relieved by any measures and the activity the patient was involved in when the pain began.

3.3.3.1 Immediate medical condition of the patient

Nearly 96,00% of the patients presented with typical symptoms of MI. Only 4,05% of the patients presented with atypical symptoms of MI. In some cases, there was no chest pain at all and one of the files reviewed revealed a patient who was in the triage area when he arrested, had arrived with the main complaint as severe backache and no chest pain. Cardio-pulmonary resuscitation was successfully accomplished, subsequently ventilated, stabilised, thrombolysed as he sustained an acute antero-lateral myocardial infarction. This finding is consistent with the research conducted by Crawford (2003:56), who found that AMI may present either in a typical or atypical form.

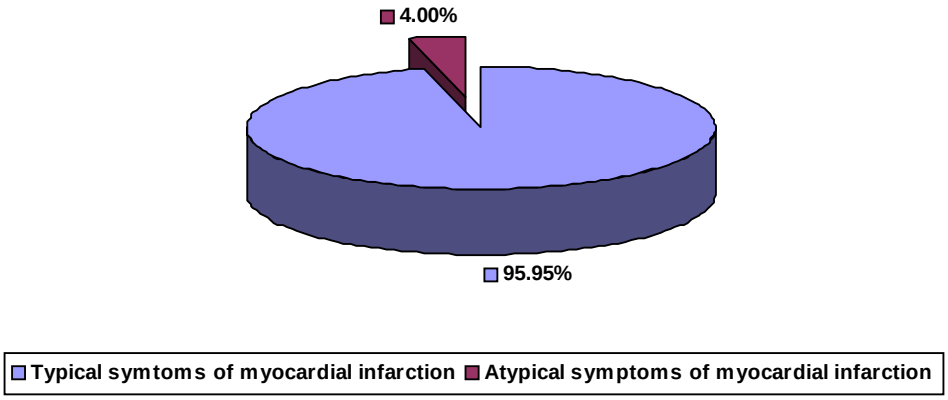

Figure 4.9

Immediate medical condition of the patient (N = 321)

4.3.3.2 Severity of pain

Almost 66,67% reported pain at a scale of 10 on the 10-point pain scale and were treated with analgesics accordingly. At least 16,82% reported a lower severity in pain scale from between 5-6 on the 10-point scale, which may indicate that they received some treatment for the pain. It should be noted that 16,51% of the patients did not present with pain at all on admission. Records reveal that the PHC centres and the private hospitals did administer nitrates and morphine to the patients prior to transfer to the Al Ain Hospital emergency rooms for thrombolysis, confirming that analgesics and nitrates, indeed, relieve pain and even halt the MI according to Antman et al (2004a:678). Managing the pain in AMI is a vital aspect of treating the patient with MI, as increasing pain levels are suggestive of ongoing ischaemia.

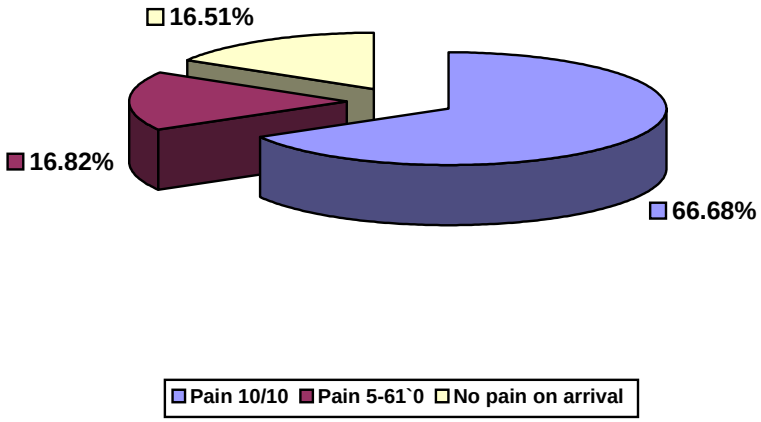

Figure 4.10

Severity of pain (N = 321)

4.3.3.3 Arrival after symptom onset

This study revealed that only 27,41% of the patients sought medical attention within the first 2 hours after symptom onset. The majority, 49,84%, fell into the 2-6 hour time period to seek

assistance after onset of symptoms; 11,52% after 6 hours and at least 7,47% arrived at hospital after 24 hours as reflected in figure 4.11. This is consistent with studies conducted by Ritzman et al (2000: 657) in Germany, where 38,00% of patients fell into the 2-6 hour group. Ritzman et al add that the patients caused the most delays and need to be improved through better educational programmes. Reilly et al (1994:300) also report that 46,00-60,00% arrived 3 hours after onset of symptoms, which is consistent with the findings of this study.

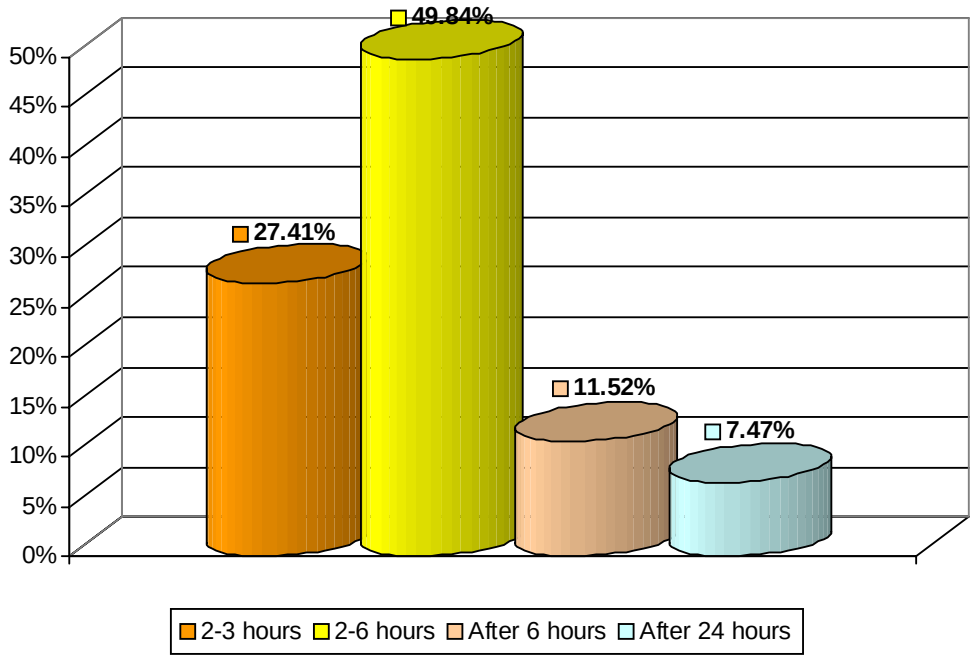

Figure 4.11

Arrival after symptom onset (N = 321)

4.3.3.4 Time of arrival from symptom onset

Table 4.3 reflects the time of arrival of the patients from the time the first symptoms presented. Most of the patients arrived within the first 6 hours (49,84%), followed by 27,41% arriving within the first 2 hours. Nearly 12 % of the patients arrived within 6-11 hours while 7,47% arrived after 12 hours of symptom onset and 3,73% after 24 hours.

Table 4.3 Time of arrival from symptom onset

TIME	N	PERCENTAGE
1 hour-59 minutes	8	27,41
1hour-5 hours 59 minutes	160	49,84
6-11 hours 59 minutes	37	11,52
>12 hours	24	7,47
>24 hours	12	3,73

4.3.3.5 Activity during onset of pain

It should be noted that 60,43% of the patients suffering from AMI were either at rest or asleep when they first experienced the pain symptoms and only 34,89 % were either at work or involved in some activity at the time of symptom onset. However, nearly 5% were not reported in the files of the patients. No other findings could be found of which similar results were obtained. The findings are reflected in figure 4.12.

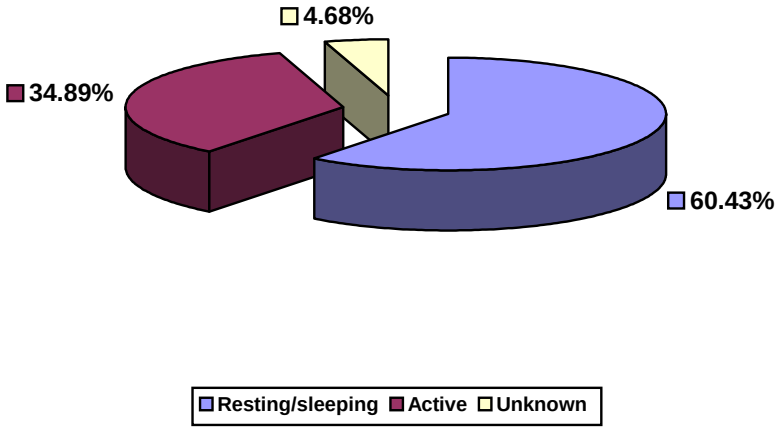

Figure 4.12

Activity during onset of pain (N = 321)

4.3.4 Section D

This section analysed and presented the time that the patient was assessed by the triage nurse, the data collection, time doctors attended to the patient, referrals to physician, time taken to make the decision to thrombolyse, the doctor who made the decision, type and time of administration of the thrombolytic agent, area where thrombolytic agent was administered and the unit where the patient was admitted.

4.3.4.1 Door-triage time

The triage time is an important aspect of the time period as it impacts significantly on the delays thereafter, and up to the actual administration of the thrombolytic agent. The first hour after onset of symptoms is the “golden hour for myocardial infarction patients’’ (Lincoff & Topol 1993:1361) and many delay before seeking medical assistance, therefore it is imperative that triaging is performed with speed as it gives the patient the greatest chance of survival.

Dowdy et al (2004: 390) advise an "aggressive triage" in reducing the door-to-needle time and Wald (1998:329) supports this by recommending a “fast-track triage” to hasten the time to thrombolyse, thus reducing door-to-needle time. Antman et al (2004a:670) recommend that the patient be shifted to the emergency area to receive treatment in 30 minutes.

At this hospital, the physical layout is such that the triage and the reception areas are in close proximity; thus facilitating emergency admissions. The patient is sometimes rushed into the resuscitation room without the emergency admission paper, which can be followed up later for the doctor to make his notes. The triage nurses are the first people to assess this patient and maintain the authority to shift the patient to the resuscitation room as the need arises and maintain full authority to advise the receptionist on completing the paperwork when the patient is placed in the appropriate area for treatment. This set-up facilitates smooth mobility of the patient from the arrival to triage and reception, to the doctor and emergency area, if the need arises.

In this study it was revealed that only 8,09% of the (26) patients were assessed prior to being registered by the receptionist, indicating that the nurses are sometimes alert to first perform the ECG and then register the patient. This is a positive finding in the study and needs to be sustained and improved to reduce the time to thrombolyse.

The outcome of the triage depends to an extent on the efficiency, knowledge and astute assessment of the triage nurse and does impact on the final door-to-needle time. Initially the patient must go to the cubicle where the doctor examines the patient and decides on the treatment required. However, in an emergency it is the triage nurse who has the authority to shift the patient to either the resuscitation room or even request an urgent ECG and consultation prior to any decision-making.

In this study, 87,85% of the patients were triaged within 30 minutes of arrival, the mean being 9,88 minutes and the standard deviation, 63,58 minutes.

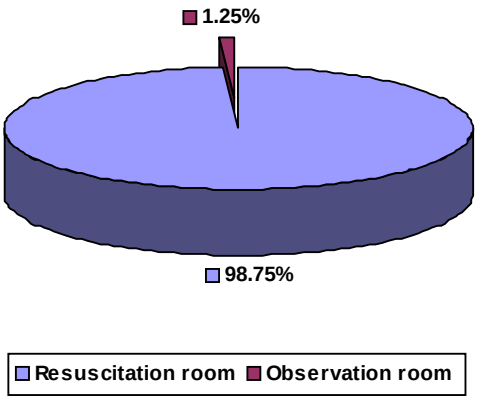

Figure 4.13

Treatment of patients (N = 321)

Almost 98,75% of the patients with chest pain were shifted to the resuscitation room soon after arrival, indicating the action taken by the nurses in the triage area, and a further 1,25% who may

have remained in male or female observation room before being diagnosed by the physician. This is an unfortunate occurrence and could be prevented, if emergency physicians are given full authority to diagnose and thrombolyse the myocardial infarction patients. Letovsky and Allen (1996: 510) urge emergency physicians to accept full responsibility for use of thrombolytic therapy, to familiarise themselves with all aspects of thrombolytic; set up protocols and clinical pathways to facilitate the rapid and secure administration of thrombolytic therapy in accident and emergency unit.

4.3.4.2 ECG initiated

Figure 4.12 indicates that all the patients admitted (N=321) had ECGs performed as part of their assessment, which forms part of the vital signs essential for a cardiac patient. The nurses initiated at least 54,21% and 44,86% were physician initiated. Obtaining the ECG within the first 10 minutes has been recommended by the NHAAP (1994:311-329) guidelines for emergency care and management (Antman et al 2004a:670*).*

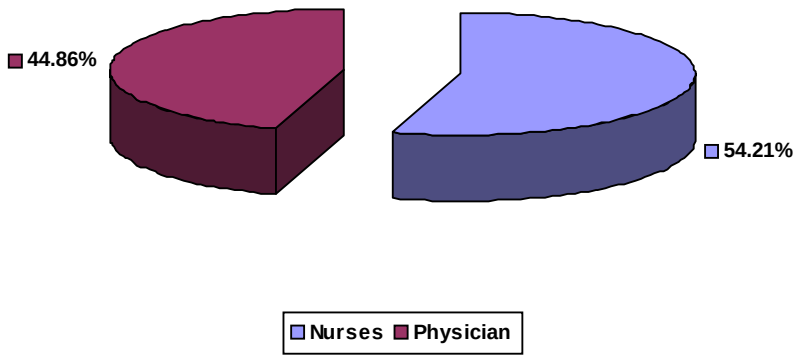

Figure 4.14

Acquisition of ECG (N = 321)

4.3.4.3 Time for ECG monitoring

In this study, 52,55% of the ECGs were collected within the first 10 minutes after arrival to triage door, and 47,45% were obtained after 10 minutes. In at least 14,00% of the cases the ECG was acquired at surrounding hospitals and PHC but was not considered as this study was focused on the door-to-needle time exclusively at this facility. The rest, namely 3,74%, had their ECG done after 1 and before 3 hours. It should be noted that the mean was 22.98 minutes and the standard deviation found to be 58.35 minutes. The findings of the time for ECG monitoring are reflected in Figure 4.13.

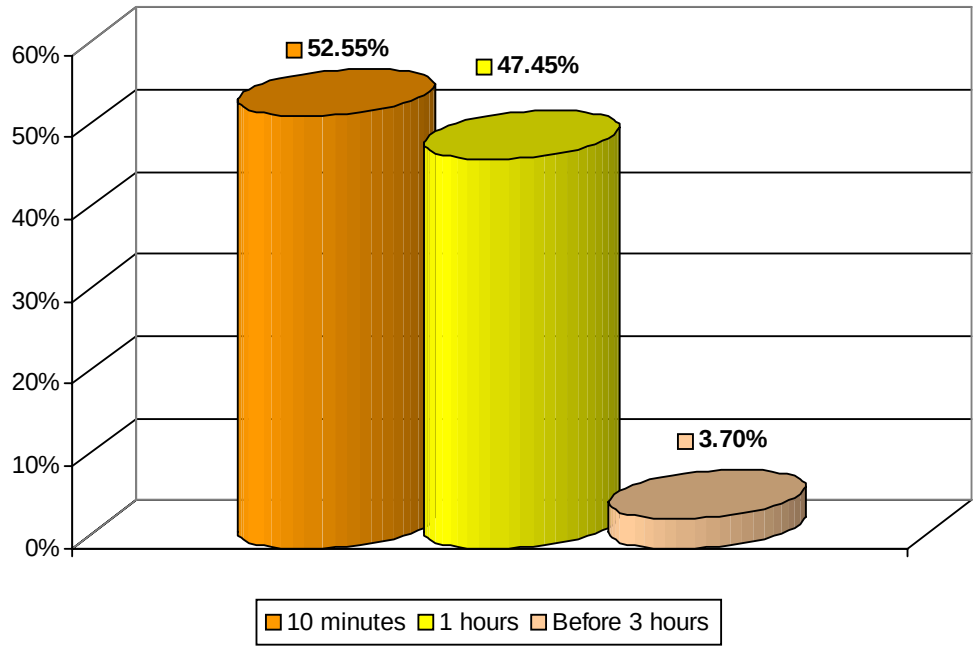

Figure 4.15

Time for ECG monitoring (N = 321)

Antman et al (2004a:670) add that ECG collection is difficult in some emergency rooms, causing unnecessary delays. The NHAAP (1994:315) recommend that the ECG collection be improved in many hospitals' emergency areas, thus eliminating difficulties, such as orders for the ECG to be

acquired, mobilising ECG attendant from another area and admitting patients without performing an ECG.

"Chest-pain rule-out MI' has been recommended by Quinn and Thompson (1995:208) to either rule out MI or confirm the diagnosis without having the patient wait his turn prior to triage. A study conducted by Davis et al (2001:35) in North Carolina revealed that the ECG was collected within 6 minutes after arrival and that 76,00% of the patients had their ECGs under 10 minutes of arrival, indicating that collection of the ECG time can be improved at this hospital also.

4.3.4.4 Doctors attendance: diagnosis, referral and decision-making

According to Edhouse et al (1999:325), cardiologists throughout the world urge the first doctor on the scene to thrombolyse the patient to reduce the delays to thrombolyse, as prehospital delays are present in most patients arriving at hospitals.

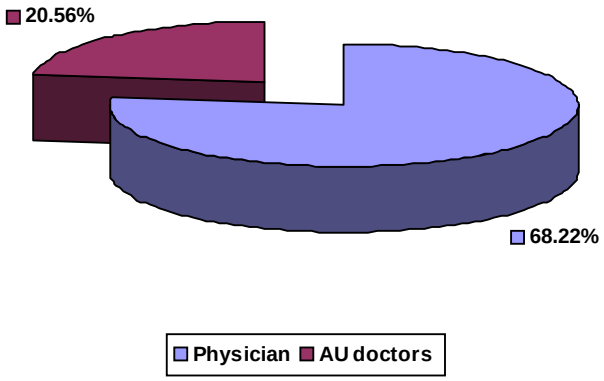

Figure 4.16

Diagnosis of AMI (N = 321)

However, at this facility the physician and cardiologist(s) make the decision to thrombolyse and the delays are evident from the time of arrival till the time the physician decides to thrombolyse.

Although the doctors in the accident and emergency unit made the diagnosis in almost 68,22% of the patients, they had to refer the patient to the physician who made the decision to thrombolyse according to the hospital policy and in 20,56% of cases the physician made the diagnosis. Letovsky and Allen (1996:510) recommend that emergency physicians be given full authority to thrombolyse MI patients on first seeing them.

4.3.4.5 Delays in the area

In this study, the delays in the treatment/administering of trombolytic therapy were concentrated mainly in the area after the doctor in the accident and emergency unit referred the patient to the physician. About 67,19% were seen within 30 minutes of referral and 35,96% after 30 minutes. Only 1,26% were seen (by the physician) within 10 minutes of referral by the AU doctor. This area appears to have been the major area where the delays occurred (see figure 4.15). The mean was 40,14 and the standard deviation, 65,18 minutes.

It should be noted that it was found that physicians made 76,64% of the decision while the cardiologist made 22,74% of the decision to thrombolyse.

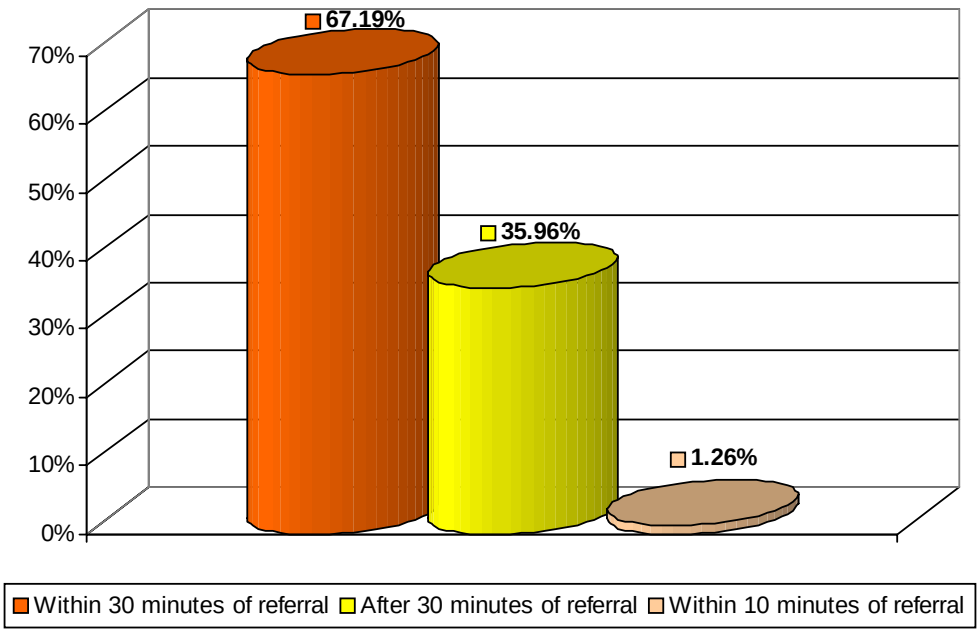

Figure 4.17

Delays in the area (N = 321)

The times that the decision was made to thrombolyse were difficult to assess due to the poor documentation, but an estimate was made from the nursing notes. The records reveal that the thrombolytic therapy was commenced almost immediately in most cases after the physician examined the patient. In a few cases, however, delays of up to 30 hours were documented. In one case, the physician discharged a patient at 06:30, after treatment for pain was given and the patient was observed in male observation room for almost 4 hours, only to return to the accident and emergency unit at 07:00, to be thrombolysed almost immediately after arrival as he had hyper-acute ST elevations. The ECG prior to this had no ST elevations. In another significant case, a patient arrived at the hospital with pain duration of 58 minutes and was transferred to the general ward as acute coronary syndrome, shifted after 3 hours into the coronary care unit and received thrombolytic therapy 2 hours later.

4.3.4.6 Time to thrombolysis administration

The administration of the agents was carried out in three different departments at the hospital, that is AU, CCU and ICU. Almost 43,30% were thrombolysed within 30 minutes after the decision was made by the physician and 29,91% received TT after 30 minutes and within 1 hour of the physician's decision, with a further 24,61% between 1 hour to 3 hours after the decision to thrombolyse. In some cases, the delays were as lengthy as 2 to 3 hours. The mean was 45,06 and standard deviation, 70,14 minutes.

The reasons for this delay must be further researched and resolved in order to reduce the time to thrombolyse and improve the patients' chance of survival in all the units.

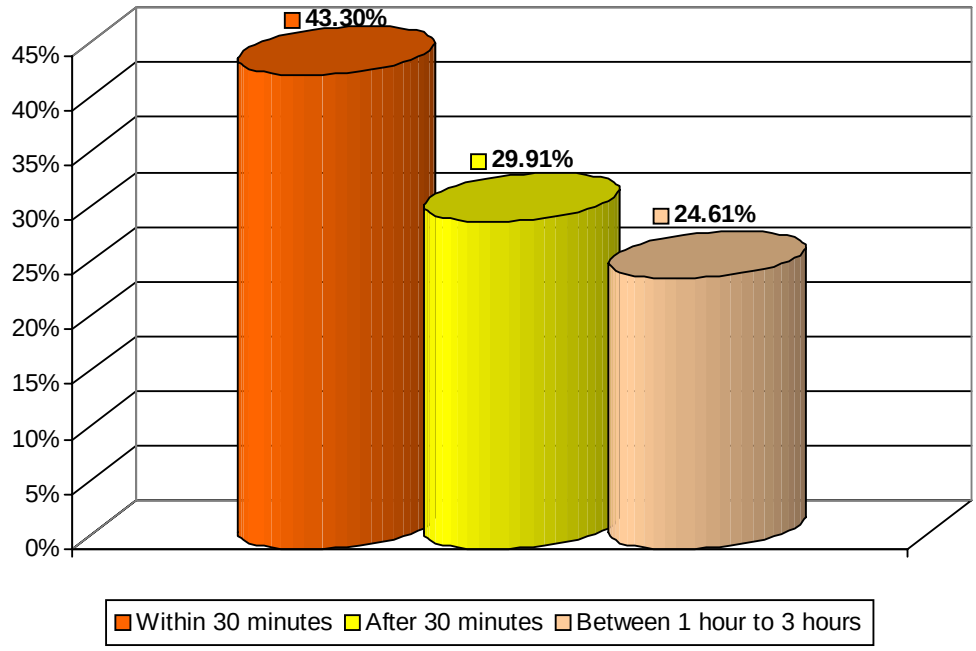

Figure 4.18

Time to thrombolysis administration (N = 321)

4.3.4.7 Commonly used thrombolytic agents

Three types of thrombolytic therapy are currently used in this hospital interchangeably and according to availability. The agents are Metalyse (TNK-t-PA), alteplase (t-PA) Reteplase (n-pa). These agents are administered as free medical emergency service to all the patients with MI at this hospital.

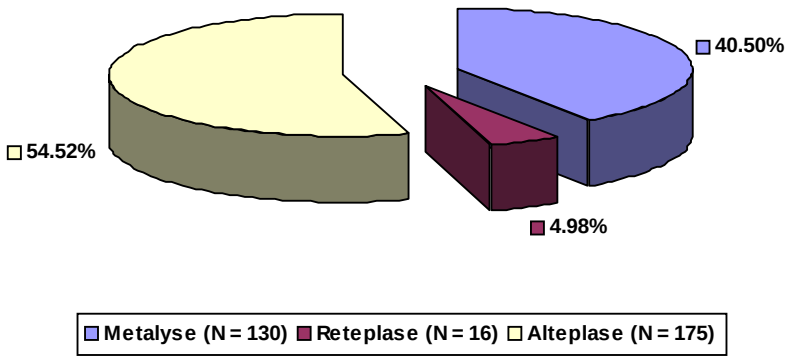

Figure 4.19

Agents currently used

Figure 4.17 indicates that Metalyse was administered to 40,50% of the total patients reviewed and given as a single bolus dose with simple to calculate weight-adjusted doses, taking over just 10 seconds to administer. This agent has the ease of single bolus dose and was administered in the accident and emergency unit with ease, decreasing the prolonged administration time when pre-hospital delays are present and, ultimately, improving the reperfusion time.

In cases where there were no beds available in either the CCU or ICU, this agent was securely administered in the AU as a single dose and the patient then shifted to the unit. This agent was

introduced to this hospital on 24 July 2002 and the benefits were remarkable in terms of reducing time delays and improving reperfusion of the myocardium with speed of bolus administration.

Reteplase was first administered on 4 November 2003 and to a total of 4,98% of patients, according to the research finding, and this agent is a double bolus-dose agent that is administered 30 minutes apart over 5 to10 seconds. It is available to patients at this hospital. Alteplase is the agent that was administered to 54,52% as the front-loaded accelerated regime as this was the only agent available at this hospital for treating MI up to 6 December 2002. However, it is still used when other agents are unavailable. This agent has a lengthy administration time thus increasing the reperfusion and myocardial salvage time. All three agents are used interchangeably according to availability.

4.3.4.8 Area thrombolysis administered

Thrombolysis was carried out mainly in the coronary care unit in 59,19% of cases as this is the highly specialised area with several experienced staff who are able to render total quality care to cardiac patients (see figure 4.18). However, delays in transfer time from accident and emergency unit to CCU and ICU were noted, with delays also in administration of the thrombolytic agent.

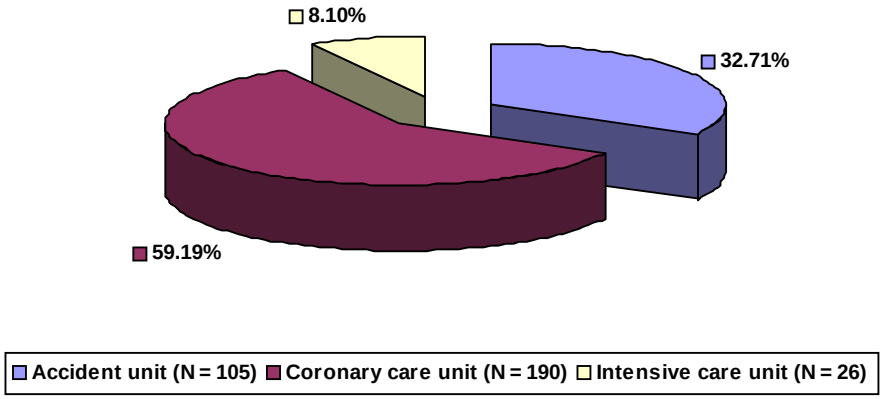

Figure 4.20

Area thrombolysis administered (N = 321)

Although pre-hospital thrombolysis is not carried out in this hospital and country currently, as recommended by Pedley et al (2003:23) and Dowdy et al (2004:390), it is encouraging to discover that 32,71% of thrombolytic therapy was administered in the accident and emergency unit, which may be partly due to a shortage of beds and partly to the heightened awareness of physicians and cardiologists with regard to the benefits of early thrombolysis for AMI patients (Topol 2000:122).

Approximately 8,10% of thrombolytic agents were administered in the ICU, which is also equipped for any emergency. However, the area is not conducive to recovery for a cardiac patient in view of the noise levels and stressful procedures that take place with other patients (Beller 2001:2428).

4.3.4.9 Admission of patients

Figure 4.19 indicates the admission of patients.

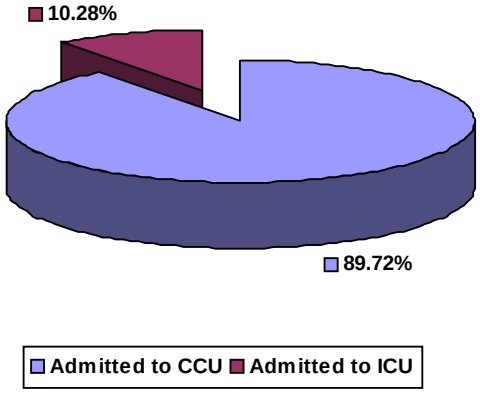

Figure 4.21

Admission of patients

Almost 89,72% of the patients were admitted to CCU and 10,28% to ICU. The ICU patients were subsequently shifted to CCU when a bed was available. Delays were noted in the admission of AMI patients to the critical areas of which bed shortage was the most common. In some cases,

there were patients who were shifted to the ward and after 4 days transferred to critical area to be thrombolysed. Some patients spent the night after receiving thrombolysis therapy in the AU due to bed shortage.

4.4 SUMMARY OF THE RESULTS

This chapter captured and presented the data according to the statistical analysis. From the findings it is evident that deficiencies exist in the overall management of the AMI patient and must be addressed to treat the patient according to the international recommendations of the NHAAP (1994:312). In addition to presenting the study objectives, the following were also added to the study as they required attention. In the final analysis of the study the following aspects were analysed and presented:

- the door-to-needle time
- the time from the onset of symptoms to needle time
- the time of ECG collection after arrival

4.4.1 The door-to-needle time

The "door-to-needle time'' refers to the time the patient arrives at hospital door till the time the thrombolytic agent is administered. According to the NHAAP (1994:312), the treatment of the AMI patient with thrombolytic therapy must be within 30 minutes of arrival at hospital. The health care providers must aim for a door-to-needle time of <30 minutes so that the patient is given the best chance of survival after AMI. The myocardial cells necrose within 15 minutes after infarction (Alpert 2003:378) and after 3 hours only 43, 00% myocardial cell viability remains after infarction (White & Van de Werf 1998:1646).

In this study, the door-to-needle time was far from the ideal time of <30 minutes to thrombolyse the AMI patient as recommended by the NHAAP (1994: 312). Numerous areas of delays have been

identified from time of arrival till thrombolysis and duly presented. These delays must be addressed and eliminated from the management of this patient so that outcomes may be successful in the administration of thrombolytic therapy.

The study revealed that only 4,36% were thrombolysed within 30 minutes of arrival at the hospital and 61,99% were thrombolysed between the 1 to 3 hour period; 16,20% within an hour and a further 13,08% were thrombolysed after 3 hours, with 2,49% who were thrombolysed after 6 hours of arrival. The mean door-to-needle time was 123 with a standard deviation of 100 minutes.

The time to thrombolyse is too long after the patient presents at the hospital and is not in accordance with the NHAAP's recommendation of 30 minutes to thrombolyse after arrival. More research must be carried out after the results have been discussed to reduce this time.

4.4.2 The symptom-to-needle time

This time refers to the time from the onset of symptoms till the time the thrombolytic therapy has been administered.

According to Welsh et al (2003:2), pre-hospital delays are present in many patients seeking medical attention for AMI, thereby contributing to delays in the overall management and time to thrombolyse. Illiteracy, denial, ignorance and fear are some of the reasons (Welsh et al 2003:2) for the delay in seeking medical assistance. In this hospital, some of the reasons for the delay in seeking help may be related to the above and also inefficiency in the transportation and distances from peripheral clinics to hospitals as well as financial constraints.

In this study, the findings revealed that only 1,25% were thrombolysed within 30 minutes to 1 hour after symptom onset and 41,74% between 3 to 6 hours; 21,81% received thrombolysis between 6 to 12 hours after symptom onset and 12,46 % after 12 hours.

The NHAAP (1994:312) recommends that the symptom-to-needle time be 90 minutes. However, this study found that the mean time was 366,05 minutes, exceeding the recommended time for maximal benefit from thrombolysis after symptom onset.

4.4.3 The door-at-ECG time

This is the time that the ECG, which is the diagnostic tool in quickly identifying AMI, is obtained after the patient presents to hospital. The recommendation by the NHAAP (1994:312), the ACC and the AHA (Antman et al 2004:678) is that the ECG be acquired within 10 minutes after the patient arrives at the hospital in order to rule in or out the diagnosis of AMI. This is also supported by Quinn and Thompson (1995:208).

Almost 52,55% met the recommendation of the NHAAP (1994:312) and the ACC and AHA (Antman et al 2004:678) recommended time of ECG collection after arrival. However, 47,45% were obtained after 10 minutes, indicating that the nurses are attempting to facilitate diagnosis of patients soon after arrival with complaints of chest pain. More can be done to reduce delays in this area as the facilities for the ECG to be collected are available to any patient who presents with chest pain.

4.5 CONCLUSION

This chapter discussed the data analysis and findings and presented them in table and graphic format. Literature was used to indicate similar findings. The data collection of 321 questionnaires revealed time delays in thrombolysis of patients suffering from AMI.

Chapter 5 concludes the study, discusses the conclusions and its limitations, and makes recommendations for practice and further research.