



## CHAPTER II

### LITERATURE REVIEW

This chapter consists of various components including ideas, the finished thesis, generalizations or conclusions, methodologies and others. These elements are included to provide relevant information and familiarize readers with the present study. Review of the related literature helps the researcher to understand the current knowledge in the field and identify the limits of the research area. It enables the researcher to define the problem, avoid unprofitable and ineffective problem areas, prevent duplication of established findings and select problems for further studies based on previous research suggestions.

#### 2.1. Review of Current Situation

##### 2.1.1. Medical Card

Currently many clinics still keeping patient's records manually. One of most popular techniques used is medical card. Medical cards are printed cards which include brief patient information. The date for each visit, diagnosis and treatment for each diagnosis. (Ping & Science, 2004).

A medical card will be generated by the nurse when the patient first visit the clinic. Usually , patient will ask by the nurse to show their identity card during registration. Then , the nurse will fill in their information based on what are stated on identify card. The nurse will also get the contact number from the patient as usual. Some of the clinics will rewrite the new patient information in a record book for backup purpose. After that , the medical card will be passed to the doctor to write down the diagnosis and treatment information after doctor diagnosed the patient and then passed it back to the dispensary.



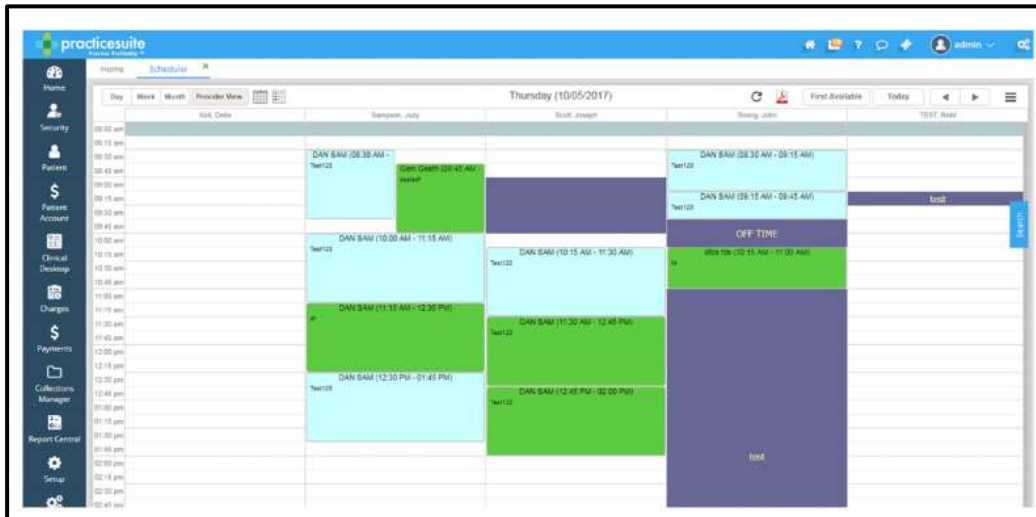
The nurse will prepare the medicine based on the prescription written on the medical card. Finally , patients gets their medicine at dispensary and they pay for it. These medical cards will be later kept in a cabinet or a rack and it is organized according to the reference number on the card.

The medical card is mainly use for recording the diagnosis and treatment that have been done on the patient. The medical card is also use for reviewing the treatment and diagnosis that is previously done by the doctor. Normally each patient will have their own medical card. However , for children less than 12 years old , they are allows to share the same card with their parents. There are some clinics groups the medical of one family under one card. Thus , doctor can refer to their family medical history using the same card.

### **2.1.2. Scheduling**

With the technology available today, it's inexcusable for medical practices to continue wasting time by making appointments manually over the phone or at the front desk. Modern medical clinic software allows you to completely automate appointment scheduling tasks, making them as simple as pressing a few buttons.

Instead of relying on spreadsheets or paper records, medical clinics can have an all-in-one solution for all appointments. Health clinic software can log new patient appointments according to the schedules of each doctor, maintain a history of all past appointments, send automated appointment reminders and follow up with patients. The software can assign a patient to the correct physician, exam room and specialty equipment needed, preventing delays. Patients can also cancel or reschedule their appointments easily online.



**Figure 2.1 Scheduling**

This not only saves a lot of time but can also significantly reduce expenses. Missed appointments can end up costing hundreds of billions of dollars to the U.S. health care system. With the help of clinic management software, clinics can reduce missed appointments. The functionalities that assist scheduling such as include Patient appointment scheduling, Appointment reminders, Online scheduling Dynamic ,Scheduling Color-coded calendar ,Patient intake forms, Telehealth appointments.(Sarkar, 2022).

### **2.1.3. Billing/Payment**

Most medical clinic management software allows practices to efficiently handle all of their billing tasks in-house rather than outsourcing them. The system can quickly submit claims to payers, respond to rejections, collect and analyze data that helps evaluate fiscal numbers and generate comprehensive reports.

One of the biggest and most robust tools involving billing/payment includes claims management. Insurance claims can be time-consuming for medical administrators and clinic management software makes it much simpler. The system can help make the entire process run almost completely autonomously, freeing up a lot of time for other tasks such as properly answering patient questions or dealing with other administrative issues. Insurance claims can automatically be swept and scrubbed of any mistakes or coding errors which often lead to denied claims. This leads to higher first-time acceptance rates. In addition, you can submit claims and track them automatically.

Clinic management software can check to make sure a patient's insurance is eligible and verified

beforehand. Tools are available to provide financial checks on patients as well as track balances. Many solutions will provide patients with options for payment plans as well.

#### 2.1.4. Patient Information

One of the biggest advantages of health clinic software, especially when considering a physician's time, is the accessibility of patient records. Medical clinic software allows physicians to easily access patient information such as medical history, medications, diagnoses, allergies and more. Rather than having to sift through paperwork to find a patient's record (if it even exists), users can access this sensitive information with the click of a button.

These systems also capture personal information such as a patient's name, address, contact information and insurance details. By giving physicians access to a patient's entire medical history, less time is spent on background questions, allowing for more focus on providing treatment. Suppose a patient switches providers for whatever reason. In that case, their medical information can easily follow them, enabling each clinician across a patient's medical spectrum to connect and share up-to-date for accurate data.

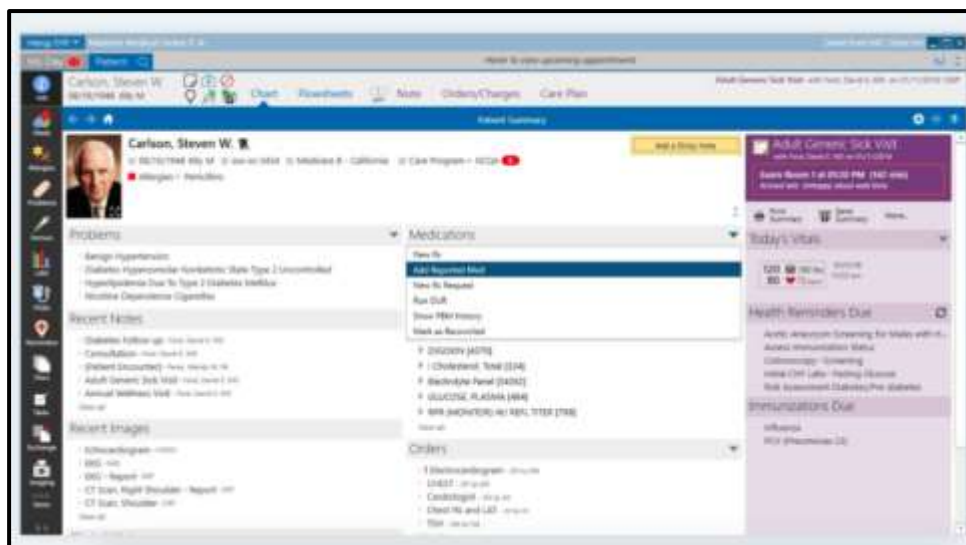


Figure 2.2 Patient Information



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### **2.1.5. Reporting**

The ability to quickly generate and store reports in one place makes it easy to ensure good communication between the clinic, its patients and insurance companies. The leading medical clinic management software systems have comprehensive reporting functionality. Users can leverage pre-made reports or create their own, compiling administrative data and patient information into timely, easy-to-read reports. Reporting allows your staff members to extract data on financial performance and a patient's financial history to identify performance gaps and trends as well as make financial estimates.

### **2.1.6. Inventory Management**

Inventory management in medical clinics can be a complicated process. Making sure that numerous supplies, such as durable medical equipment (DME) or pharmaceutical samples, are in stock and conveniently stored can be a challenge. Clinic management software can streamline the process by providing an efficient way to track inventory orders, manage inventory storage and generate comprehensive reports all without the need for manual data entry.



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## 2.2. Review of Related Literature

According to Karim (2008), interoperability concerning a specific task is said to exist between two applications, when one application can accept data from the other and perform the task in an appropriate and satisfactory manner without need of extra operator intervention. One of the main challenges in introducing patient healthcare records is the development and use of systems that advance communication and information sharing. Sharing information is an essential aspect of communicating with colleagues and patients about delivery of care. The absence of instant access to patient healthcare information is the cause of one-fifth of medical errors. According to Sales (inside Hanseth, 1996), many healthcare professionals work autonomously, the deficiency of accessing vital healthcare information segments and shared knowledge can produce duplicate clinical tests to be arranged and leads to additional cost, pain and danger. Hence, connected and unconnected electronic systems should be coordinated and interoperable i.e. healthcare information is accumulated and stored into an electronic holding place called as Data repository. All relevant data would be shared between healthcare professionals in the same or different organizations”.

According to Inettutor.com (2019), “Indicates that one of the important issues in paper-based records are, all the clinical information is written in free style and chances are high to miss or forget some important information, as this will lead to serious effect on patient’s treatment and care. The case sheet is a hard copy that can be accessed by one person at a time and needs physical transfer for other physicians to access. “Retrieving a record will be a hard task given number of medical records present and missing a record won’t be a surprise in a huge pile of paper based medical records. Moreover, with time, information in paper records gets diminished of ageing paper and ink, even fire accidents or natural disasters can ruin the archive of paper records” .(Abdul, 2008). Karim (2008) explains that all the above discussed issues can be over-come by implementing EMR/EPR systems, it can not only solve the problems but also improves the efficiency of healthcare by increasing accessibility and needs less resources to maintain records. EPR system can be used as a resource of researchers, it will be a tool for disease surveillance, which can be used for public health initiatives and for practicing Evidence based medicine.



The invention of the computers has brought about the revolution of Information Technology (IT). In the past few decades, offices, factories and business have increasingly adopted the use of computers to enhance their performances and outputs. Along with that, today, computers can be found in every household as well.

There are significant advantages of using computers in medical institutions. In recent times, their importance has grown manifold, due to the fact that the procedures have to be speedy for catering to a larger population and the medical services have to be more precise.

According to Apter (2007), in the committee of nations, Nigeria often denotes fraud and corruption. The extent of involvement of fraud perpetrators in Nigeria and those operating outside the shores of the country is unquantifiable. Apter stated that fraudulent practices range from online identity theft, marketing of non-existent goods, prosperity churches, false non-governmental organizations soliciting funds from foreign donors, to outright imposition by persons as government officials awarding bogus contracts. The activities of corrupt elements in society have tarnished the social and corporate image of the nation, causing a drought of foreign investment in the country (Andrew H. Apter, 2007). Corruption exists in every facet of life in Nigeria and has negatively affected the willingness of international investors to do business in Nigeria.

The engagement of the larger society in corruption occurs by ambivalent complicity (Andrew H. Apter, 2007). Sustained aiding and abetting of corruption in the Nigerian society makes it Nigerian impossible for the nation to rise above mediocrity in almost every area of socioeconomic endeavour including health care (Apter, 2007).

According to Mendoza & Almuete, n.d (inside ayo (2008)), in a study of the framework for implementation of ecommerce in Nigeria decried the abysmally low internet-access in the country. Internet connection enables affected data management system, picture archival and communication system and specifically important for running radiological information system and teleradiology. Other requirements include well-trained health care workers and information system administrator

According to Benham-Hutchins (2009) because of challenges involved in integrating new hospital information systems with old paper documentation and record systems, clinicians and other health care



practitioners may become encumbered with multiple and conflicting sources of patient information. Multiples of paper and electronic documentation may disrupt a seamless workflow and influence the quality and efficiency of service delivery. These circumstances also have the potential to cause new types of medical errors resulting from poor harmonization of patient information. Understanding these concerns requires examination of human factors in the design of technology that is able to adapt to the way health care providers do their job. The delivery of patient-friendly services demands that health care providers continue to work toward improvement in the method of care pathways and processes.

## 2.3. Review of Related Products

### 2.3.1. Clinic Pro Medical Software

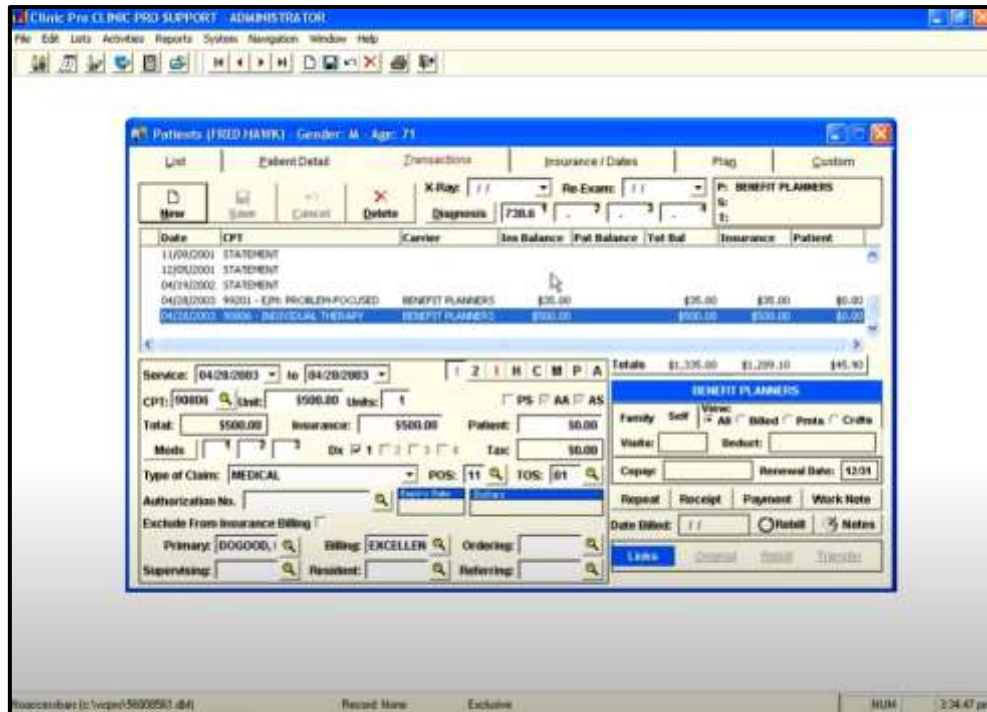


Figure 2.3 Clinic Pro Medical Software - Patient Display

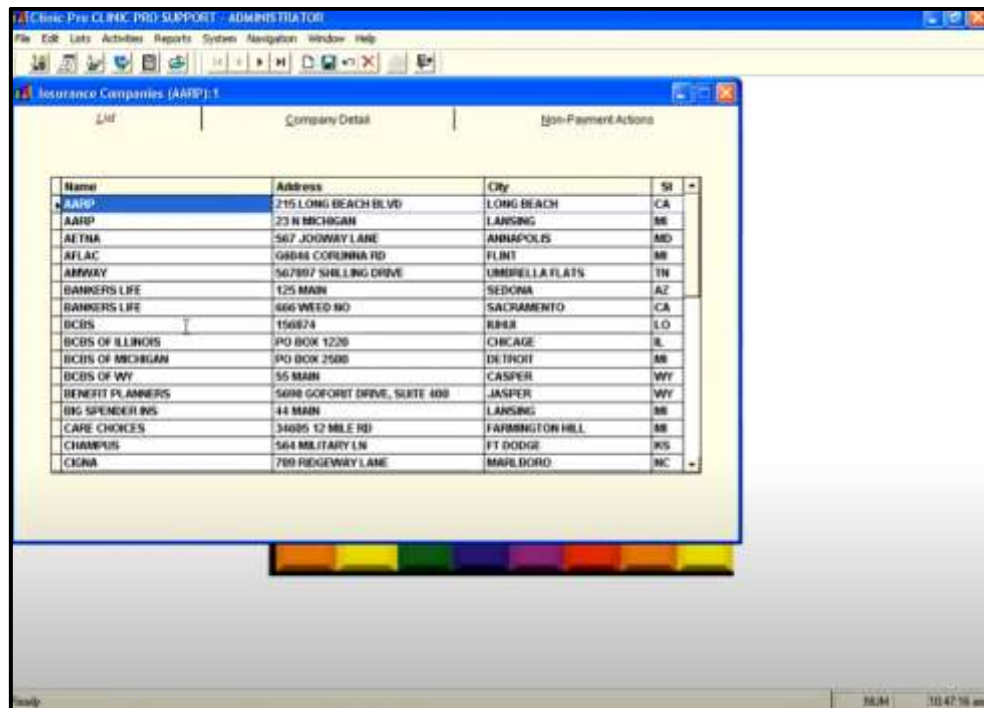
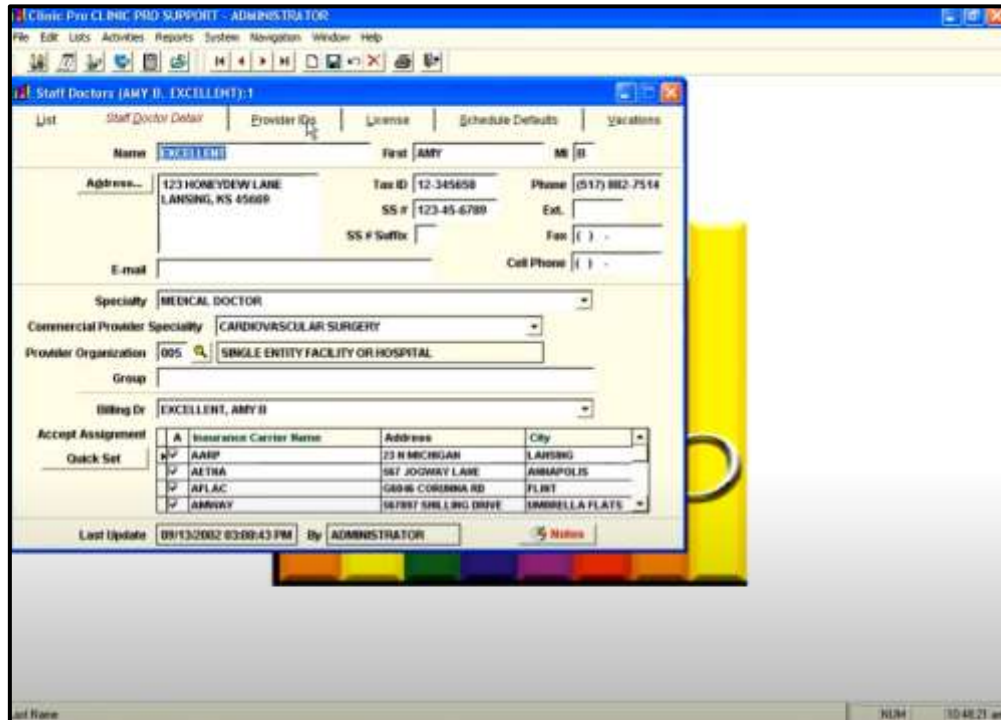


Figure 2.4 Clinic Pro Medical Software - Insurance Companies Display

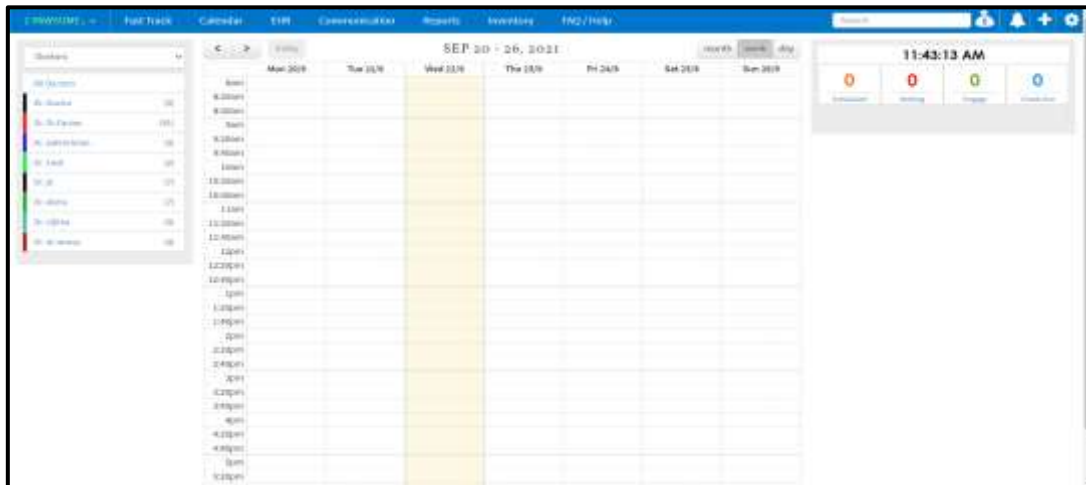


**Figure 2.5 Clinic Pro Medical Software - Staff Doctors Display**

Clinic Pro is a medical practice that provides healthcare services to patients. It is a professional healthcare facility that offers a variety of medical services, such as preventive care, diagnosis, treatment and management of diseases and illnesses.

This complete medical practice management software including electronic claims, appointment scheduler, management reports and medical records.

### 2.3.2. PappyJoe



**Figure 2.6 PappyJoe Display**

PappyJoe Clinic Software is a comprehensive digital solution designed to streamline the workflow and operations of clinics and healthcare facilities. It provides a range of features and tools that help healthcare professionals manage patient records, appointments, billing, inventory and more.

This software is specifically designed to handle all of the clinical, administrative and financial needs of a Single Clinic as well as Polyclinics to facilitate efficient centralized Operation.



### 2.3.4. Encore Clinic Software

Date: 25/May/2002 Show All Registered Patients

Q.No	Patient Name	Ref. No	CMSPN	Time In	Dur	Doctor	Status	Billed	Paid
1	TAN SO	2246401	6	3:33:40 PM	00:02	DANO	IN	\$0.00	\$0.00
2	DIWYA	144102	8	3:33:56 PM	00:02	DANO	IN	\$0.00	\$0.00
3	HERAWA	912	912	3:34:06 PM	00:02	DANO	IN	\$0.00	\$0.00
4	TAN SIE	1348904	16	3:34:14 PM	00:02	DANO	CN	\$0.00	\$0.00
5	EVELYN	127111	50	3:34:24 PM	00:02	DANO	IN	\$0.00	\$0.00
6	CHUA ANG	0473804	17	3:34:32 PM	00:01	DANO	IN	\$0.00	\$0.00
7	CHOO CHO WAJ	0855727	147	3:35:02 PM	00:01	DANO	DP	\$0.00	\$0.00
8	CHEUNG YU KAU	0421700	663	3:36:10 PM	00:00	DANO	BL	\$57.75	\$2.00

IN - Registration CN - In Consult or Service DP - Drug Dispense BL - Billed PP - Partially Paid FP - Fully Paid

Figure 2.7 Encore Clinic Software - Patient Queue Display

Register Patient

Search By (Enter Search Criteria - Leave BLANK for all patients)

Family Name: TAN Given Name:

CMSPN:  Alias:

Patient Ref. No:  Tel.No:

NRIC/ID:  Address:

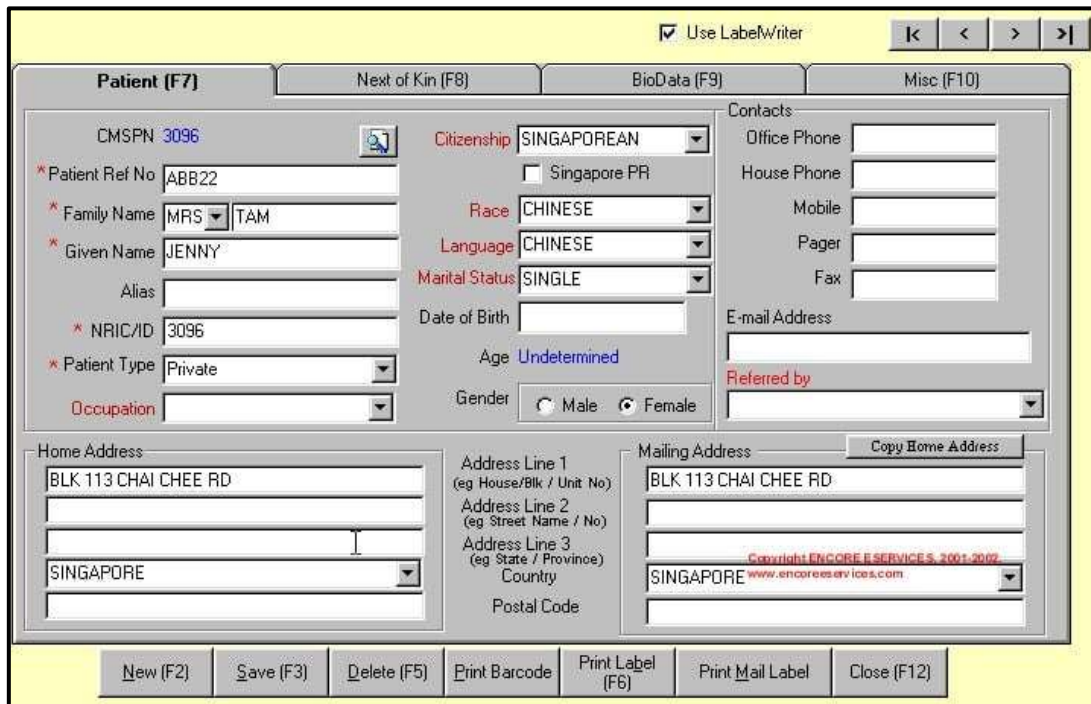
Date of Birth: / / (dd/mm/yyyy)

Last Visit Date: From: 17/Nov/2000 To: 17/Nov/2000 Find (F2)

CMSPN	Family Name	Given Name	Ref No	NRIC/ID	Corporate Id	Dat
1856	TAN	AH KEE	6839217	I026320	NA	11/
2729	TANG	AH KED	1013676	H02489676	NA	01/
323	TAN	AH LEN	0715258	C080012	NA	27/
1479	TAN	AH MO	1881679	J07031	NA	17/
62	TAN	AH OOI	2552913	Z13942913	NA	18/
2619	TAN	AH SIE	0807073	C06218073	NA	01/
570	TAN	AH SUA	0127286	C25599286	NA	21/
2927	TAN	AH TENG	0636719	D03076719	NA	08/
1014	TAN	AI HUING	298477	B09707	NA	24/
2041	TAN	AI NGDH	0038250	B02928	NA	09/
648	TAN	CHWEE LIAN	2775283	F05722	NA	21/
391	TAN	CHWEE LEONG	1063269	255157 269	NA	02/
2100	TAN	CHYE HAR	2194016	H06636	NA	01/
302	TAN	SEOK HWA	715356	C09795	NA	
2633	TAN	AH NGDH	2115748	D01829748	NA	23/
1694	TAN	LAY HOON	1132635	A04105635	NA	09/
1151	TAN	ING CHENG DI...	6874684	B15982584	NA	05/
68	TAN	POH TIN	0215441	J15363	NA	01/

HealthPlan: NA Register (F3) Close (F12)

Figure 2.8 Encore Clinic Software - Patient Registration Display



Use LabelWriter

**Patient (F7)**    Next of Kin (F8)    BioData (F9)    Misc (F10)

CMSPN 3096    Citizenship SINGAPOREAN    Singapore PR

\* Patient Ref No ABB22    Race CHINESE    Office Phone

\* Family Name MRS TAM    Language CHINESE    House Phone

\* Given Name JENNY    Marital Status SINGLE    Mobile

Alias    Date of Birth    Pager

\* NRIC/ID 3096    Age Undetermined    Fax

\* Patient Type Private    Gender  Male  Female    E-mail Address

Occupation    Referred by

Home Address: BLK 113 CHAI CHEE RD

Address Line 1 (eg House/Blk / Unit No): BLK 113 CHAI CHEE RD

Address Line 2 (eg Street Name / No):

Address Line 3 (eg State / Province): SINGAPORE

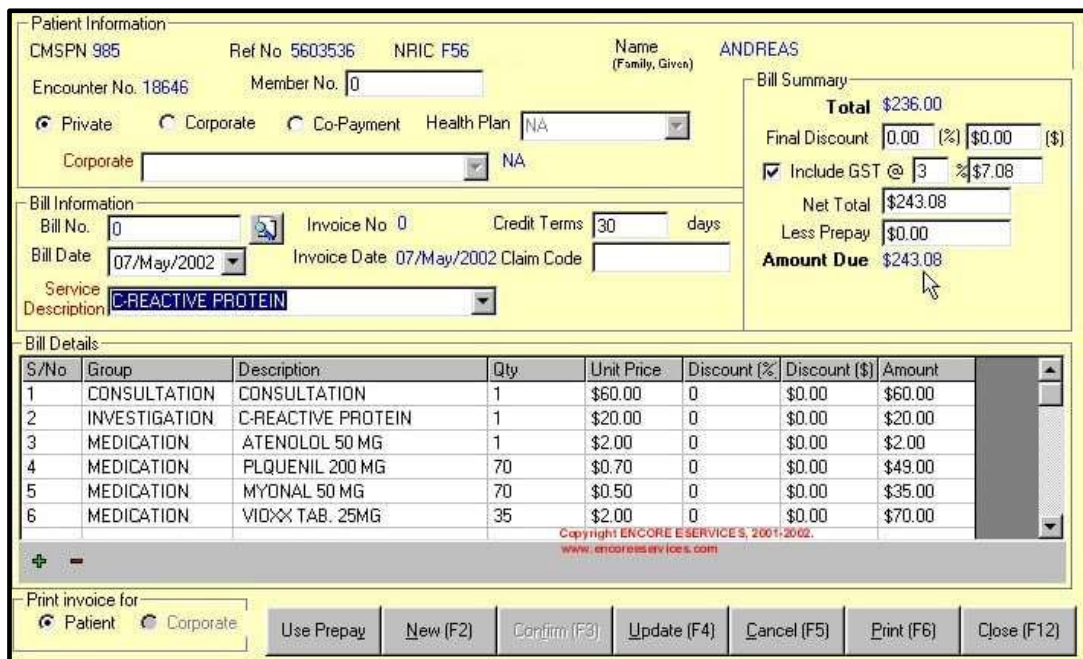
Country: SINGAPORE

Postal Code:    Mailing Address:    Copy Home Address

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New (F2)    Save (F3)    Delete (F5)    Print Barcode    Print Label (F6)    Print Mail Label    Close (F12)

Figure 2.9 Encore Clinic Software - Patient Record Management Display



Patient Information

CMSPN 985    Ref No 5603536    NRIC F56    Name ANDREAS (Family, Given)

Encounter No. 18646    Member No. 0

Private     Corporate     Co-Payment    Health Plan NA

Corporate NA

Bill Information

Bill No. 0    Invoice No. 0    Credit Terms 30 days

Bill Date 07/May/2002    Invoice Date 07/May/2002    Claim Code

Service Description: C-REACTIVE PROTEIN

Bill Summary

**Total** \$236.00

Final Discount 0.00 (%) \$0.00 (\$)

Include GST @ 3% \$7.08

Net Total \$243.08

Less Prepay \$0.00

**Amount Due** \$243.08

Bill Details

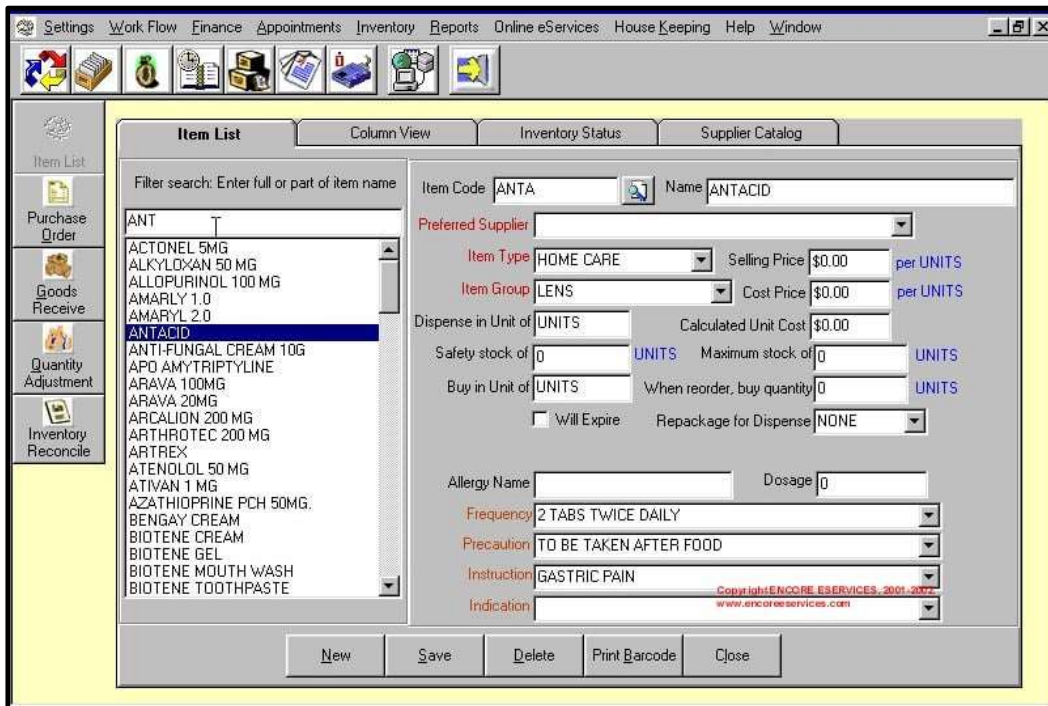
S/No	Group	Description	Qty	Unit Price	Discount (%)	Discount (\$)	Amount
1	CONSULTATION	CONSULTATION	1	\$60.00	0	\$0.00	\$60.00
2	INVESTIGATION	C-REACTIVE PROTEIN	1	\$20.00	0	\$0.00	\$20.00
3	MEDICATION	ATENDLOL 50 MG	1	\$2.00	0	\$0.00	\$2.00
4	MEDICATION	PLQUENIL 200 MG	70	\$0.70	0	\$0.00	\$49.00
5	MEDICATION	MYONAL 50 MG	70	\$0.50	0	\$0.00	\$35.00
6	MEDICATION	VIDXX TAB. 25MG	35	\$2.00	0	\$0.00	\$70.00

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Print invoice for  Patient  Corporate

Use Prepay    New (F2)    Confirm (F3)    Update (F4)    Cancel (F5)    Print (F6)    Close (F12)

Figure 2.10 Encore Clinic Software - Billing Display



**Figure 2.11** Encore Clinic Software - Inventory Display

Encore Clinic Software is a web-based software designed to help small to mid-sized medical practices manage their day-to-day operations. The software includes features such as appointment scheduling, patient registration, billing and insurance claim management. It also offers tools for managing electronic medical records, prescription management, lab orders and patient communication. Encore Clinic Software is highly customizable, allowing medical practices to tailor it to their specific needs. It is also designed to be user-friendly, ensuring that medical staff and patients can easily navigate it. The software is offered as a subscription-based service and is HIPAA compliant, ensuring the security of patient data.



### 2.3.5. Comparisson Product

Table 2.1 Comparisson feature Table Product

<b>Comparisson Product</b>				
<b>Features</b>	<b>Clinic Pro Medical Software</b>	<b>PappyJoe</b>	<b>Encore Clinic Software</b>	<b>Clinic Management System</b>
Login	No	No	No	Yes
Payment/Billing	Yes	No	No	Yes
Medicines	No	No	No	Yes
Reporting	Yes	Yes	Yes	Yes
Schedule of Staff	No	No	No	Yes
Appointment	No	No	No	Yes
Access User	No	No	No	Yes