DESIGN OF RADIOLOGY REGISTRATION INFORMATION SYSTEM FOR OUTPATIENT PATIENTS USING VISUAL BASIC 6.0 IN XYZ COMMUNITY HEALTH CENTER

Jajang Haryanto
Politeknik Piksi Ganesha
Bandung, Indoneisa

Yuyun Yunengsih
Politeknik Piksi Ganesha
Bandung, Indoneisa

Yuda Syahidin
Politeknik Piksi Ganesha
Bandung, Indoneisa

Abstract. This study aims to design a Radiology Patient Registration Information System for the XYZ Health Center. The research employs a descriptive method with a qualitative approach to data collection and analysis. The findings reveal several issues in the outpatient registration process for radiology patients at the XYZ Health Center: (1) registration is still conducted offline, resulting in inefficiencies, and (2) patient data calculations are done manually, relying on calculators. The recommendations are: (1) Implement an online registration system to improve access to patient data for staff, and (2) utilize digital data processing to eliminate the need for manual calculations. For developing this Information System, Visual Basic 6.0 is used as the programming language, with Microsoft Office Access 2003 for data storage.

Introduction

A hospital is a complex healthcare institution that is both professionally and capital intensive. This complexity arises from the wide range of services provided, which

involve various functions, education, research, and numerous medical specialties. To achieve optimal health outcomes—particularly in efforts to improve public health through high-quality services—hospitals must have skilled professionals in both medical technology and healthcare administration. According to the National Health System, a hospital's primary function is to deliver and manage health services focused on patient treatment and recovery.

According to Law Number 44 of 2009 concerning Hospitals, a hospital is defined as an institution providing comprehensive individual health services—covering promotive, preventive, curative, and rehabilitative care—through inpatient, outpatient, and emergency services. General hospitals, as described in the law, offer health services across all medical fields and treat all types of diseases. Specialized hospitals, on the other hand, focus on specific types of care based on a particular scientific discipline, age group, organ system, disease type, or other specialization. A hospital's role is to provide a full range of health services to the community, addressing all types of diseases, from basic health care to advanced subspecialist services, according to its resources and capabilities.

In addition to providing health services, hospitals serve as centers for specialized and sub-specialized medical referrals, focusing on curative and rehabilitative (recovery-oriented) care. To fulfill this role, hospitals must be structured to use their resources efficiently and effectively.

Advancements in technology and new diagnostic and therapeutic methods demand that hospitals employ a range of medical and support professionals, making them highly specialized, labor-intensive organizations. Hospitals manage the transformation of diverse inputs—such as physicians, nurses, support staff, infrastructure, and equipment—into quality patient care.

Outpatient, or polyclinic services, provide direct health care to patients, where medical information from anamnesis, medical history, physical examinations, laboratory tests, X-rays, diagnoses, therapy, the course of disease, and clinical interventions are gathered. Outpatient services are part of the hospital's operations, serving patients for under 24 hours and covering all diagnostic and therapeutic procedures. This description highlights that medical support services are also fully available in the hospital's outpatient unit.

One type of medical support service is radiology. Radiology services, as an integral part of comprehensive health care, align with the mandate of the 1945 Constitution, which upholds health as a fundamental right of every citizen, and with Law Number 23 of 1992 concerning Health. Given this and the growing demand for health services, radiology departments must provide high-quality services.

General radiology services, and diagnostic radiology in particular, are now provided in a wide range of healthcare facilities, from basic centers like community health clinics and private practices to large-scale hospitals, such as Class A hospitals. Advances in science and technology have made it possible to detect various diseases using diagnostic radiology, which includes both ionizing and non-ionizing radiation services. Over time, diagnostic radiology has seen significant progress, both in terms of equipment and techniques used.

Based on the issues identified, the author has chosen to explore these challenges as the focus of a journal report titled: Design of an Outpatient Radiology Registration Information System Using Visual Basic 6.0 at the XYZ Health Center.

Primary Problem

Given the background information, the author formulates the main question:

"What is the current state of the outpatient registration information system at the XYZ Health Center?"

Research Questions

Based on the main issues identified, the following research questions have been formulated:

A. What is the procedure for registering outpatients in the radiology department at the XYZ Health Center?

B. What challenges are encountered in designing an outpatient registration information system for the radiology department at the XYZ Health Center?

C. What measures are being taken to address the issues in the outpatient registration information system for the radiology department at the XYZ Health Center?

D. What are the outcomes of the design of the outpatient registration system in the radiology department at the XYZ Health Center?

E. How is the process of designing the outpatient registration system in the radiology department at the XYZ Health Center carried out?

Specific Purpose

1. To learn about the procedures for registering outpatient radiology patients at XYZ Health Center.

2. To identify the barriers in designing an information system for registering outpatient radiology patients at XYZ Health Center.

3. To identify the results of designing an outpatient registration system at XYZ Health Center radiology facility.

4. To identify the difference in ease of obtaining information, availability of information and timeliness of outpatient radiology patient registration system between manual systems and computerized systems.

SCIENTIFIC REVIEW

A. Understanding Information System Design

According to Sutanta (2014: 121), system design is "the earliest phase that provides guidance for the next steps." The system planning phase includes the following activities:

1. Identify the problem.

2. Define the problem.

3. Set objectives.

4. Identify obstacles.

5. Feasibility study.

6. Report to management.

After completing the system analysis phase, system analysis has provided a clear picture of what needs to be done. Now it is time for system analysts to think about how to design the system. This phase is called system design.

The phase after system analysis, according to Sutanta (2014: 122), is "system design," in which the system analyst thinks about how to shape the desired new system. System design can be interpreted as:

a) Post-analysis phase of the system development cycle

b) Defining functional requirements.

c) Preparing for implementation design.

d) Delineating, planning, and sketching or arranging several individual elements into a complete and functioning unit.

e) The phase that concerns the configuration of the software and hardware components of a system.

According to Sutanta (2014: 123), system design includes the following activities:

A. Prepare a detailed design of the system.

B. Identify the hardware and software configuration of the system.

C. Evaluate alternative system configurations.

D. Select the best hardware and system software configuration.

e. Report to management.

The system planning phase can be divided into two parts namely:

1. General system design or conceptual design or logical design.

2. Detailed system design (detailed system design) or physical system design (physical system design) internal design (Sutanta, 2013: 123).

System implementation is, according to Sutanta (2014: 123), "a phase of implementing the system design results that were previously implemented into the actual form". System implementation includes the following activities:

A. Set up hardware.

B. Set up software.

C. Set up database.

D. Prepare physical facilities.

e. Train users.

F. Prepare management report.

Using system evaluation is, according to Sutanta (2013: 123), "the final stage of system development in the form of using the results of system implementation". Utilizing the system includes the following activities:

1. System operation.

2. System evaluation.

3. Maintain the system.

4. Perform system performance.

5. Improve system performance.

6. Report and management.

According to Sutanta (2014: 124), there are several systems development approaches as follows:

A. Classical approach

The classical approach emphasizes that the development of an information system will be successful if it follows the appropriate phases of the system development life cycle.

B. Structured approach

From the 1970s onwards, a new approach emerged, the structured approach. This approach basically tries to provide system analysts with additional tools, techniques and documentation to develop systems while following the previously known phases of the information system development life cycle.

Some examples of the tools, techniques and documentation concerned are as follows:

1. HIPO diagram (Hierarchy of Input Process Output).

2. Data Dictionary (DD).

3. Data Flow Diagram (DAD).

4. Decision Table (Decision Table).

5. Project Network (Program Evaluation and Review Techniques / PERT).

6. System Flow Diagram etc

C. Bottom-Up Approach (Bottom-up)

The bottom-up approach is a feature of the classical approach in which information systems development focuses on the need to process transactional data at the lowest level and then moves upwards to provide information compiled on the basis of existing transactional data.

D. Whole system approach

A whole system approach is an approach to develop a whole system at the same time.

e. Modular Approach

The modular approach attempts to break complex systems down into smaller parts or simple modules so that the system is easy to understand and develop.

F. Long Jump Approach

The long jump approach is a systems development approach that implements comprehensive changes simultaneously using the most advanced technology available at the time.

G. Evolving Approach

The development approach is a systems development approach that applies advanced technology only to applications that are needed at that time and will continue to evolve in the future as technology evolves.

B. Information Systems

According to Sabarguna (2005:36), a system is an entity that represents and consists of various factors that are related or considered to be related and affect each other, all of which are consciously prepared to achieve predetermined goals, so the system has the following characteristics:

1. There is a clear goal;

2. Has a specific structure;

3. Consists of a unified effort of parts that are interdependent and interact with each other.

Information is data that has been formally, correctly and effectively processed and analyzed so that the results can be useful for operations and management. (Sabarguna, 2005: p. 3).

Information has the following characteristics:

a) Data that has been processed in a form that is more useful and meaningful to those who receive it.

b) Describes real events and entities.

c) Is used to make decisions.

According to Sabarguna (2005: 8), an information system is a specific way of providing the information that organizations need to do business successfully and for business organizations to operate in a profitable manner.

C. Management Information System

According to Sabarguna (2015: 15), a management information system is an information system that supports hospital management in decision making.

According to Sabarguna and Listiani (2018: 83), when developing information systems, these are, among others, things that need to be considered:

1. Service unit implemented;

2. Resources used;

3. Data on quality and effectiveness indicators.

According to Sabarguna and Listiani (2008: 83), the above mentioned things are components that represent data that are processed into information. Good information must be useful information and must have, among others, the following characteristics: Information is not data

a) Relevant

b) Sensitive

c) Unbiased

d) Comprehensive

e) Timely

f) Activity-oriented

g) Uniforms

h) Aligned with performance objectives

i) Cost-effectiveness

In general, the information needed for management revolves around the following:

a) Information for long-term determination and planning

b) Information for needs assessment and performance planning

c) Information for resource allocation and cost control

d) Information for quality assessment and control

e) Information for program evaluation.

D. Radiology Concepts

1. Understanding Radiology

According to Big Indonesian Dictionary, third edition (2017:919). Radiology is "the science of medicine that uses X-rays or radioactive rays to detect diseases". Radioactive means that it is or displays radioactivity. Meanwhile, radioactivity is the property of several elements that can emit spontaneous radiation particles or gamma rays by destroying the nucleus of an atom.

2. Definition of Radiology Services

Radiology services are one of the medical support services of hospitals and are carried out by a service unit called radiology installation (Sri Rahayu: 2019). Radiological services in the health sector continue to improve in line with technological developments in the health sector. Using radiology equipment that does not meet safety requirements can have negative effects on both the operator and the environment.

3. Standard Guidelines for Hospital Radiological Services pursuant to the Decree of the Minister of Health of the Republic of Indonesia No. 1333/Menkes/SK/XII/1999.

A. Philosophy and Objectives

The radiological facility in the hospital provides the best imaging radiological services to patients who need them sincerely and responsibly. The criteria are:

1) Radiological imaging services are adapted to the development and objectives of the entire hospital

2) Radiological services are carried out in accordance with the service standards set by the Indonesian Ministry of Health and professional standards are adapted to the developments in medical technology

3) The radiology facility provides routine hospital services and emergency services 24 hours a day

4) When the hospital management is to make decisions on radiological functions and equipment, the opinions and suggestions of the radiologist staff must be sought first.

E. Types of radiology services

Based on the Decree of the Minister of Health of the Republic of Indonesia No. 1014/MENKES/SK/XI/2008 on Standards for Diagnostic Radiology Services in Health Institutions. Types of radiology services are:

1) X-ray (X-ray)

2) CT scan

3) DSA

4) Ultrasound (Ultrasound)

5) MRI (Magnetic Resonance Imaging)

F. Information System Design Concept

According to Feste Azwar (2014:75), outpatient care is a medical service provided to patients who are not designated for inpatient treatment (hospitalization).

Outpatients in radiology are patients who come to the radiology institution to receive radiology services by bringing a letter of recommendation from the outpatient clinic or a practicing physician outside the hospital.

"Service is an action to meet the needs of other people (consumers, customers, guests, clients, patients, passengers, etc.), whose satisfaction can only be felt by the person serving and being served." Sugiarto (2015:36).

The purpose of outpatient services includes providing advice to patients who need a specialist opinion on whether treatment is useful or not. In addition, services are also provided

According to Big Indonesian Dictionary, 5th edition (2009), "inpatient care is patient care through the administration of medicine and care and maintenance in a hospital."

"Inpatient treatment is a medical service provided to those affected by a health facility who need to stay overnight in that health facility due to their illness" (SPM, 2014).

"Inpatients are sick people who are treated by doctors, sufferers who need to live somewhere to receive care or attention" Bambang Moehijanto (2214:133).

G. Procedure of the outpatient admission service in radiology

A. Outpatient patient

1) Patients undergoing a radiological examination bring an introduction from the doctor

2) For private patients, the costs incurred by the radiological procedure are first listed and then paid at the cash desk

3) The patient returns to the radiology department with a payment receipt for the radiological procedures to be performed

B. For contract patients

1) The patient comes to the radiology department with a letter of introduction from the doctor

2) The officer checks that the reference letter is complete

3) If the reference letter is complete, please indicate the costs incurred using the special form

4) Patients can undergo radiological treatment immediately at the request of the sending doctor

C. For emergency room patients

1) The emergency room employee sends a confirmation to the radiology officer

2) Radiology officers prepare tools and materials

3) The emergency room employee takes the patient to the radiology facility to act in accordance with the radiology referral letter and brings a referral letter from the examining physician.

4) Administrative officers record patient data in a daily report book, record the costs incurred, and inform the emergency department staff.

5) The radiology officer takes action according to the physician's referral letter.

6) After the results are received, the radiology officer informs the emergency department officer

H. Visual Basic 6.0

A. Understanding Visual Basic 6.0

Visual Basic 6.0 is a programming language that is very easy to understand and very popular. Visual Basic was developed by Microsoft in 1991 to replace BASIC programming language. (Firdaus, 2016: 4)

According to Novian (2014: 1), a minimum set of equipment is required for smooth programming:

1. PC 200 MHz

2. 1 GB Hard Disk

3. Color SVGA Monitors

4. RAM 32 MB

5. Windows 98 Operating System

6. MS Software. Visual Basic

7. MS Software. Access

B. Getting Started with Visual Basic

To enable Microsoft Visual Basic 6.0, we can follow the following steps (Kurniadi, 1999: 3):

1. Click on the "Start" button on the taskbar.

2. Then select "All Programs". In the next step, select "Microsoft Visual Basic 6.0" located in the "All Programs" submenu, and then click "Microsoft Visual Basic 6.0".

After completing this step, the New Project dialog box will appear as follows:

I. Hospital Concept

Based on Law No. 44 of 2009 on Hospitals, it states that a hospital is "a comprehensive individual health service facility (including promotive, preventive, curative and rehabilitative) that provides inpatient, outpatient and emergency services." The law defines a public hospital as a hospital that provides health services for all areas and all types of diseases. On the other hand, a specialty hospital is a hospital that provides primary services in a specific area or type of disease based on scientific discipline, age group, organ, disease type or other specialty. Hospitals should not be considered a separate and independent entity in the health system. Hospitals are part of the health system and their role is to support basic health services by providing referral facilities and support mechanisms.

According to the World Health Organization (WHO), "hospitals must be integrated into the health system in which they are located. Its function is to be a resource centre for improving public health in the region" (WHO Hospital Advisory Group Meeting, 1994). (Hartono, 2010: 4).

J. Concept of Medical Records

1. Understanding Medical Records.

A. A medical record is a file containing notes and documents related to identity, medical history, diagnosis, treatment, procedures and other services provided to a patient during treatment in the emergency department. (General Director of Yanmed, 2015:6)

B. A medical record is a file containing notes and documents related to the patient's identity, examination, treatment, procedures and other services provided to the patient. (PerMenKes No.269/MenKes/Per/III/200)

2. Purpose of Medical Records

The purpose of the Medical Records service is to support the realization of orderly administration as part of efforts to improve health services in hospitals. According to the General Director of Yanmed (2015:85), the uses of medical records are now:

A. As a communication tool between doctors and other professionals involved in providing services, treatment and care to patients.

B. As a basis for planning the treatment/care that needs to be given to the patient.

C. As a written record of all service actions, disease development and treatment during the patient's visit/treatment in the hospital or health center.

D. As a useful material for research analysis and evaluation of the quality of services provided to patients.

e. Protecting the legal interests of patients, hospitals, doctors and other health personnel.

F. Provides special data that is very useful for research and educational purposes.

G. As a basis for calculating the cost of paying for patient services.

H. Becomes a source of memory that needs to be documented and serves as a material for accountability reports.

3. Medical record activities

Based on the Circular of the Director General of Yanmed No. YM 00.03.2.2. 1296 (2014: V) in the management of medical records in hospitals generally includes activities that include:

A. Patient reception.

B. Admission.

C. Medical data processing.

D. Medical data storage.

e. Repetition.

4. Medical record aspects

According to the Director General of Yanmed (2015:47), medical records contain several aspects, namely:

A. Administrative aspects

A medical record file has administrative value because its contents include actions based on authority and responsibility as medical personnel and paramedics in achieving health service goals.

B. Medical aspects

A medical record has medical value because the records serve as a basis for planning a patient's treatment/care.

C. Legal aspect

A medical record has legal value because its content relates to the issue of ensuring legal certainty based on justice in the effort to maintain and provide evidence to maintain justice.

Legal basis for medical records:

1) Health Law No. 23 of 1992 on Health

2) Government Regulation No. 10 of 1996; Regarding the obligation to maintain medical secrets/State Institutions, Government Regulation No. 21 of 1996; State Authority Supplementary No. 2803.

3) Law No. 7 of 1971; On the basic provisions of archives.

4) Health Ministerial Decree No. 034/Birhub/1972; relating to the planning and maintenance of hospitals, which states, among other things, that in order to support the implementation of a good master plan, every hospital must:

a) Have and maintain up-to-date statistics.

b) Maintaining a medical record based on established provisions

5) Regulation No. 269/menkes/per/XII/2008 of the Minister of Health on Medical Records.

D. Financial Aspects

A medical record has monetary value because its contents contain data/information that can be used for financial aspects.

E. Research Aspect

A medical record has research value because its contents contain data/information that can be used as part of research and scientific development in the health sector.

F. Educational Aspect

A medical record has educational value because its contents contain data/information about the chronological development and activities of medical services provided to patients. This information can be used as teaching material/reference in the user's professional field.

G. Documentation Aspect

A medical record has documentation value because its contents are storage sources that need to be documented and used as material for hospital accountability and reports.

K. Outpatient admission procedures.

Generally, outpatient admission procedures are divided into two procedures, namely:

1. Outpatient admission of new patients

Namely, the procedures for admitting patients who are undergoing outpatient treatment when the patient comes to the hospital for treatment for the first time.

2. Outpatient admission for old patients.

Namely, the procedures for admitting patients who want to receive outpatient treatment when the patient has already been treated in a hospital before.

The following procedures apply for admitting outpatients at the registration office:

A. Greet the patients in a friendly manner.

B. Ask whether they have received treatment or not.

C. Interview and take notes:

1) Patient name.

2) Date of birth.

3) Full address.

4) Occupation.

5) Payment method.

6) Recommendations.

7) Religion.

8) Marital status.

9) The destination polyclinic.

D. Recording the interview results:

1) Medical record form.

2) Outpatient register book.

3) KIB.

4) KIUP.

5) Record or provide the medical record number on the medical record, KIB and KIUP forms.

6) On the outpatient form, record the date of visit and the name of the polyclinic.

7) Hand over the KIB to the patient and inform him about the importance of bringing the KIB when returning to the hospital for treatment.

8) Keep KIUP in an alphabetical storage location.

9) Invite the patient to the destination polyclinic and provide information about the location of the destination polyclinic.

L. Understanding Data Flow Diagrams (DFD).

Data flow diagrams are "modeling tools that allow systems professionals to describe a system as a network of functional processes interconnected by data flow, either

manual or computer-based." This DFD is often referred to as a bubble diagram, bubble chart, process model, workflow diagram, or functional model.

(http://tavipia.staff.gunadarma.ac.id/download/files/15425/DFD.pdf)
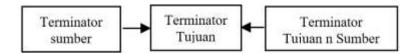
1. Components of Data Flow Diagram.

According to Yourdan and DeMarco

2. Terminator Component/External Entity

The terminator represents an external entity that communicates with the evolving system. Usually, the terminator is referred to as an external entity.

There are two types of terminators:

A. Source Terminator (Source): is the terminator that represents the source.

B. Destination Terminator (Sink): is a terminator that represents the destination of system data/information.

M. Understanding Entity-Relationship Diagram (ERD)

According to Kinoyo (2017:99), ERD is "a graphical notation in conceptual data modeling that describes relationships between stores." ERD is used to model data structures and relationships between data.

According to Koniyo (2017:99), three symbols are basically used, namely:

1. An entity is "an object definable in the usage environment that is important to the user in the context of the system being created."

2. Attributes Entities have elements called attributes that serve to describe the character of the entity, for example, the element name attribute of the element entity.

3. Relationships – Relationships are like entities, even with relationships, a distinction must be made between the relationship or relationship form between entities and the content of the relationship itself.

N. System Analysis

1. Performing a system analysis.

System analysis is the process of breaking down a complete system into its component parts with the aim of identifying problems. By analyzing the system, the deficiencies of the current system can be identified. So that later the designed system can correct the deficiencies present in the running system. The following problems are encountered in medical record loan:

1. The ongoing process of loaning medical records is still done manually, including:

A. The process of recording credit and return data.

B. Errors are often made while entering the numbers of medical records in the credit expedition book.

C. The preparation of the report still takes the data from the manual which is entered into the computer.

2. Existing report data is stored only on a media card system or similar medium where the medium is very vulnerable to data corruption.

3. The preparation of reports on loan of medical records is done by the head of the outpatient medical record.

O. Design of an information system for outpatient registration in radiology

1. Login design display

2. View registration data

3. View patient data

4. View inspection data

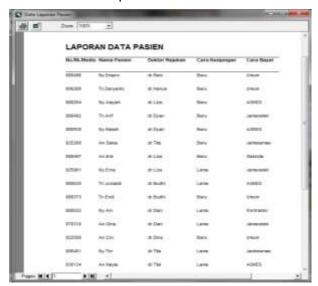5. View action type

6. View X-ray film size

7. Doctor data display

8. Visit report display

9. Patient data report

Conclusion

Based on the results of the research conducted in Karangsari Community Health Center, an overview of the outpatient radiology registration information system was prepared, so the author reached several conclusions, including:

A. The outpatient radiology registration information system in Karangsari Community Health Center is currently still manual and offline.

B. In Karangsari Community Health Center, there are the following problems in the outpatient radiology registration information system:

1. The management of outpatient radiology registration is still manual and offline.

2. It is more difficult for administrative officials to summarize medical record data because they have to calculate patient data using a calculator. Officials have difficulty finding data such as doctor data and the number of X-rays used because they have to open the registration book.

Suggestion

Based on the conclusions of the research conducted, several suggestions can be made that can be used as material for further consideration in the effort to improve the outpatient radiology patient registration process in Karangsari Community Health Center.

A. For the management problem of outpatient registration in radiology, which is still done offline, it would be best to establish an online registration information system to make it easier for officials to search for patient information, examination types and referring doctors.

B. Simplify the monthly reporting process so that the calculation of X-ray consumption and number of patients is more accurate. through the use of computerization.

References

A. DOCUMENTS
1. Depertemen Pendidikan Nasional. (2017), ***Kamus besar bahasa Indonesia edisi ketiga,*** Balai Pustaka Jakarta.
2. Direktoral Jendral Bina Pelayanan Medik, Depkes RI tahun 2016
3. Keputusan Menteri Kesehatan RI Nomor : 983/Menkes/SK/XI/1992
4. Pedoman Penyelenggaraan & Prosedur Rekam Medis di Rumah Sakit
5. Permenkes No. 269/2018 & UU No. 29/2004
6. Permenkes No: 269/MENKES/PER/III/2008
7. Permenkes RI No. 159b/MenKes/SK/PER/II/1988
8. Permenkes RI Nomor 147/Menkes/Per/I/2010 Undang-Undang Nomor 44 Tahun 2009

B. SCIENTIFIC BOOKS

1. Al Fatta, Hanif. 2017. Analisis & Perancangan Sistem Informasi. Yogyakarta. ANDI.
2. Arikunto, Suharsimi. Prof. Dr. 2017. Prosedur Penelitian Suatu Pendekatan Praktik. Rineka Cipta. Jakarta.
3. Azwa, Azrul. Prof. Dr. M.P.H.1996. Pengantar Administrasi Kesehatan. Binarupa Aksara. Jakarta
4. Depertemen Pendidikan Nasional. (2017), Kamus besar bahasa Indonesia edisi ketiga, Balai Pustaka Jakarta.
5. Firdaus. 2016. 7 Jam Belajar Interaktif Visual Basic 6.0 untuk Orang Awam. Maxikom.
6. Hariyanto, Bambang (2008), Dasar Informasi & Ilmu Komputer Disertai Aksi-Aksi Praktis, Graha Ilmu, Yogyakarta.
7. Hatta, R. Gemala. 2016. Pedoman Manajemen Informasi Kesehatan Di Sarana Pelayanan Kesehatan Revisi Buku Petunjuk Teknis Penyelenggaraan Rekam Medis/ Medical Record Rumah Sakit (2018) Dan Pedoman Pengelolaan Rekam Medis Rumah Sakit Di Indonesia (1994, 2010) Edisi Revisi. PENERBIT UNIVERSITAS INDONESIA (UI-PRESS).
8. Hartono, Bambang. Dr. SKM. MSc., MM. Manajemen Pemasaran Untuk Rumah Sakit. Rineka Cipta.
9. Jogiyanto. HM.,MBA., Akt., Ph. D. 2015. Analisis & Desain Sistem Informasi : Pendekatan Terstruktur Teori dan Praktek Aplikasi Bisnis. Yogyakarta. ANDI.
10. Kusrini, S.Kom. & Koniyo, Andri. 2017. Tuntunan Praktis Membangun Sistem Informasi Akuntansi dengan Visual Basic dan Microsoft SQL Server. ANDI Yogyakarta.
11. Ladjamudin, AL. Bahra Bin (2015) Analisis dan Desain Sistem Informasi, Graha Ilmu, Yogyakarta.
12. Madcom dan Andi. 2016. Panduan Pemrograman dan Referensi Kamus Visual Basic 6.0. Madcom dan Penerbit Andi.
13. Moenir, H.A.S (2012), Manajemen Pelayanan Umum Di Indonesia, Jakarta : EGC.
14. Novian, Agung. (2014), *Panduan Microsoft Visual Basic – Anda Pasti Bisa*, Andi. Yogyakarta.

15. Sabarguna, Boy H. Dr. dr. MARS dan Listiani, Henny.Drg.M. Kes. 2018. Organisasi Dan Manajemen Rumah Sakit Edisi Revisi. Konsorsium, Yogyakarta.
16. Sabarguna, Boy H. Dr. dr. MARS. 2015. Sistem Informasi Manajemen Rumah Sakit Edisi Revisi. Konsorsium. Yogyakarta.
17. Sabarguna, Boy H. Dr. dr. MARS. Manajemen Pelayanan Kesehatan Rumah Sakit Berbasis Sistem Informasi. 2015. Konsorsium, Yogyakarta.
18. Sugiyono, DR. Prof, 2008. Metode Penelitian Administrasi dilengkapi dengan Metode R&D. ALFABETA
19. Sutanta, Edhy. 2003. Sistem Informasi Manajemen. Graha Ilmu.