Internship Training

at

KareXpert Technologies Pvt. Ltd.

Perception of the HMIS End Users on the Functionalities of the Software on a Tertiary Care Hospital.

by

KOMAL

Enroll No.- PG/20/026

Under the guidance of

Prof. Divya Aggrawal

PGDM (Hospital & Health

Management) 2020-22

International Institute of Health Management Research
New Delhi

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Certificate of Dissertation

The certificate is awarded to

Komal

In recognition of having successfully completed her Internship in the department of

Healthcare Implementation

and has successfully completed her Project on

Perception of the HMIS End Users on the Functionalities of the Software on a Tertiary Care Hospital

Date: 08 March- 08 June2022

KareXpert Technologies Pvt Ltd.

She comes across as a committed, sincere & diligent person who has a strong drive & zeal for learning

We wish her all the best for future endeavors

Training & Development

Human resources

TO WHOMSOEVER IT MAY CONCERN

This is to certify that Komal student of PGDM (Hospital & Health Management) from International Institute of Health Management Research, New Delhi has undergone internship training at KareXpert Technologies Pvt Ltd. from 08 April to 08 June 2020.

The Candidate has successfully carried out the study designated to him during internship training and his/her approach to the study has been sincere, scientific and analytical.

The Internship is in fulfillment of the course requirements. I wish him all success in all his/her future endeavors.

Dr. Sumesh Kumar
Associate Dean, Academic and Student Affairs
IIHMR, New Delhi

Prof. Divya Aggarwal
IIHMR,New Delhi

Certificate of Approval

The following dissertation titled " **Effect of HMIS Functionalities on the Performance of Hospital**" at **"KareXpert Technologies Pvt Ltd."** is hereby approved as a certified study in management carried out and presented in a manner satisfactorily to warrant its acceptance as a prerequisite for the award of **PGDM (Hospital & Health Management)** for which it has been submitted. It is understood that by this approval the undersigned do not necessarily endorse or approve any statement made, opinion expressed, or conclusion drawn therein but approve the dissertation only for the purpose it is submitted.

Dissertation Examination Committee for evaluation of dissertation.

Name	Signature
Dr S B GOGIA	
Dr Anadhi Kaushik	

Certificate from Dissertation Advisory Committee

This is to certify that **Ms.Komal,** a graduate student of the **PGDM (Hospital & Health Management)** has worked under our guidance and supervision. He/ She is submitting this dissertation titled "**Perception of the HMIS End Users on the Functionalities of the Software on a Tertiary Care Hospital**" at "KareXpert Technologies Pvt Ltd." in partial fulfillment of the requirements for the award of the **PGDM (Hospital & Health Management).**

This dissertation has the requisite standard and to the best of our knowledge no part of it has been reproduced from any other dissertation, monograph, report or book.

Prof. Divya Aggarwal,
Associate Dean
IIHMR, Delhi

Mr. Abhishek Malik
Team Lead
KareXpert Technologies Pvt Ltd.

INTERNATIONAL INSTITUTE OF HEALTH MANAGEMENT RESEARCH

NEW DELHI

CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled Acceptance of Hospital Management Information System among End Users and submitted by Komal Enrollment No. PG/20/026 under the supervision of Prof. Divya Aggrawal for award of PGDM (Hospital & Health Management) of the Institute carried out during the period from 08 April 2022 to 08 June 2022 embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other Institute or other similar institution of higher learning.

Signature

FEEDBACK FORM

Name of the Student: Komal

Name of the Organisation in Which Dissertation Has Been Completed: KareXpert Technologies Pvt Ltd.

Area of Dissertation: Product Delivery

Attendance: 100%

Objectives achieved: Completed all the tasks assigned, learn new things

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Suggestions for Institute (course curriculum, industry interaction, placement, alumni):

Signature of the Officer-in-Charge/ Organisation Mentor (Dissertation)

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Place: Delhi

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Table of content

OVERVIEW OF THE COMPANY

KareXpert Technologies Pvt. Ltd

KareXpert is India's first SaaS-based integrated digital healthcare platform. It is a Jio Platform funded venture with the aim of connecting 100,000 hospitals in the next five years. The company offers end-to-end digital empowerment to hospitals and healthcare providers through its comprehensive range of AI-enabled, cloud-based, and mobile-ready solutions that are designed for coordinated patient care, optimize operational costs, and increase revenue. KareXpert platform has its customers ranging from Nursing Homes to Large Corporate chains with 100+ medical facilities which are live or under Implementation.

Earlier in legacy systems hospitals used to buy digital solutions from third party vendors and integrate them into their operations. For example, with the Covid breakout, one would require telemedicine software or mobile applications, which would necessitate contacting multiple vendors. Hospitals may not have pre-integrated solutions, resulting in a shattered patient experience loss of revenue, poor operating efficiency, and substantial hidden costs. It also affects the ability of the hospital to give a higher quality of care to patients and make it more affordable. To solve these issues, KareXpert did 2 years of research and then developed the DIGITAL HEALTHCARE PLATFORM using a limitlessly scalable technology stack rather than a legacy product and integrated approach. The platform-based approach comes with pre-integrated and ready-to-service full-stack solutions. It offers Advanced HIMS, EMR/EHR, LIMS, RIS/PACS, pharmacy, connected ambulance, e-Claim & insurance, inventory & SCM, queue management, MIS Reports, business intelligence, and hospital branded mobile apps. The KareXpert SaaS platform helps hospitals to streamline patient data flow across geographies and devices. It also helps them achieve a higher degree of collaboration between all stakeholders in the healthcare system. KareXpert is a SaaS-based commercial concept in which hospitals pay a monthly fixed cost. The solution includes a Cloud Gateway that allows medical equipment (Lab, Radiology, and so on) and IoT devices to connect directly to the platform.

Vision

Incorporating hospitals to provide quality healthcare solutions to their patients anywhere, anytime by digitizing their end-to-end operations.

Mission

KareXpert leader in technology started the Company in 2014 with Specific Purpose: To reinvent and redefine our Indian healthcare system to deliver the promise of "Health is national right for every Citizen"

Creating the 10,000 grid of largest hospitals by 2025

Product of KareXpert:

Hospital Information System

The Hospital Information System (HIS) is a piece of software that manages all aspects of a hospital's workflow, including medical, financial, legal, administrative, and healthcare performance. It also scans all paper records and converts them to digital format.

A hospital information system (HIS) is a collection of applications for managing healthcare data. It serves as a centralised database that collects and stores all information about patients, doctors, and employees. As a result, healthcare providers can provide a speedy diagnosis by accessing a patient's health information at any time. It also comprises data-handling systems for hospital operational management and healthcare policy decisions.

A typical HIS should contain:

Practice Management System

The practise management system is intended to assist healthcare staff with the centre's everyday operations. This covers scheduling and billing, as well as inventory management and other services. It can be used by anyone, from small practitioners to multi-centre institutions, to automate numerous administrative processes.

Patient Portal

The patient portal is a platform that allows patients to access their health information. They can also use the app to schedule appointments with their doctors. It also allows consumers

to receive lab results via the portal and maintain active connections with their healthcare providers and pharmacists.

Clinical Decision Support (CDS)

CDS assists with the analysis of data from a variety of clinical and administrative systems. It aids clinicians in making well-informed clinical decisions. These details are used to help in diagnosis and to forecast medical occurrences such as drug interactions.

Remote Patient Monitoring (RPM)

RPM devices collect data from patients and provide it to healthcare specialists who are not available in that location. It can track blood sugar levels, blood pressure, and medical occurrences like heart attacks. It can be extremely beneficial for patients who are unable to receive face-to-face medical care but are suffering from a chronic illness.

Along with the basic modules Karexpert platform contains the following features:

EMR/HER

Patient Profile is to Monitor, track and upload patient's medical records, diagnostic reports, prescriptions etc.

E-Prescription is used to send E-prescriptions to the patients and keep the record of the whole treatment process.

Diagnostic Reports for instant access to diagnostic reports along with doctor notes to all the stakeholders.

Progress Reports to get a visual representation of the progress made by the patient throughout the treatment with custom notifications configured for any abnormality.

MRD-Medical Record Department is used to keep trail of your physical files of old records along with new digital medical records of the patient and make sure nothing goes missing.

MAR-Medicinal Administration Request maintains the MAR worklist, medication administration, enable order list for Drug intent and manage frequency & Time mapping.

Medicinal Order is used to prescribe only those medicines which are in stock with an inbuilt intuitive drop-down suggestion. It also sends auto-updates to the pharmacy for quicker turnaround time.

Clinical Order comes with the predefined templates to help you to quickly set up any procedural orders or testing order.

Specialty Focus provides customized templates as per specialty empower the hospital staff to quickly process the patient data.

OPD Management

Patient Portal- It is a self-service portal for everything that a patient wants. \

Alert Manager is to keep the patients informed about their health status.

Queue Management for managing all online & walk-in appointments, Manage queues, TV displays and token systems.

IPD Management

ADT Admission, Discharge and Transfer for IP admissions, transfers, bed management, and discharge management.

OT Management has Interactive dashboards, OT work-list & transfer list, surgery scheduler, and manage approvals to manage cath-lab schedule, work-list, transfers, etc.

Clearance Status -Keeps track of the clearance status of the patient.

Diet Management is used to create, manage, and share the diet plan of the inpatient with hospital mess department. It also contains Dietician schedules, diet plan creators, and pre-build diet templates

Billing Management

IP & ER Billing to get paid faster and more by managing IP Billing, planned discharge, clearance status, refund, and cashier operations efficiently.

OP Billing to manage orders, diagnostic, PHC, consultations bills, settle dues, refund, and manage collection.

Account Receivable (TPA) - One place to manage all your account receivables. Manage payment received, settlements, and outstanding.

Send due alerts. Online Payment accepts online and offline payments via Credit Cards, Net banking, Wallets, and EMI cards.

Doctor Pay-out is used to setup doctor profiles, configure services, post bill, and manage final payments.

Operations Management

Facility Management -Manages single or multiple hospital facilities, setup billing, manage departments, doctor schedules, etc. in few clicks.

Housekeeping- Manage day-to-day housekeeping activities at the hospital.

CSSD-Maintain CSSD inventory, indent request/issue/acknowledge, and view stock.

Patient Feedback Management

Feedback Management to continuously monitor, measure, and improve your service quality with department wise patient feedback, ticketing board, and dashboards.

Doctor Portal Doctors Profile allows the doctor to register, edit profile page, availability, view patient records manage appointments, search, sort, find nearest Hospital, make e-prescription, and provide tele-consultation via video, audio, or chat.

LIS and RIS

Supports all kinds of labs gives full visibility of sample journey from sample collection to acknowledgement to dispatch.

Sends sample reports to the patients and auto verification alert to the doctors Books patient appointments against different machines.

Make patient data available at modality to eliminate dual data entry Track lab occupancy with scan in/out of the patient

Easy **DICOM** image processing -Lets the patient, doctor and other stakeholders get access to digital scans on web/mobile apps.

Pharmacy

Gives instant access to e-prescriptions and auto-filling of order right from the prescriptions Manages returns and acknowledge return orders.

Maintains the requisition order for medicine, supplies, etc. Centrally track full or partially issued orders.

Revenue Tracking & Reporting

With the detailed and integrated billing module, we can track payments & settlement without any errors.

Gives us the detailed Business Reports Track business growth with real-time reporting and gain insights into business operations

Inventory Management

Gives the dynamic view of available stock ensures effortless inventory planning Real-Time Alerts & Notifications for various inventory and supply chain events

Emergency Response System

Gives full visibility on ambulance operations like:

Ambulance Dispatch System to Request, Approve, Assign, and centrally manage fleet of ambulances and have full visibility of available ambulance for dispatch.

Checklist Management to create and manage the checklist of action items that need to be followed by the paramedic/ER staff.

Start & Stop Ride-Manage vehicle availability and track turn-Around-Time (TAT) from the start-to-stop ride

Monitor Patient Vital Health using integrated medical IoT devices, ER doctors at the hospital can monitor patient vitals like BP, ECG report, temperature, etc. as soon as the patient is on boarded to an ambulance.

Doctor Tele-consultation enables ER doctor tele-consultation while inpatient is in transit.

PROJECT REPORT

INTRODUCTION

HMIS functions have become a critical component of technological innovation in hospitals around the world. This is due to the fact that various factors influence hospital performance, and a large number of stakeholders are engaged, therefore interests are either overlapping or competing. Data management and automation have aided in rapid progress all around the world. Computers are already used in nearly every field where humans work. The usage of Management Information Systems (MIS) in the health industry has risen dramatically around the world for a variety of reasons, including labour savings, advanced inspection of hospital operations, and better planning and patient care. Hospitals have become very important places for providing good healthcare to clients, healthcare technology, and the medical care structure of delivery systems have all changed.

HMIS functions are an integrated and comprehensive information system designed to manage the clinical, financial, and administrative elements of a hospital. It entails the processing of paper-based data as well as the storing and processing of equipment. People, software, and hardware all play a role in HMIS functionality. HMIS functionality standardises management reporting in support of patient care and administrative applications, decreasing the work and time spent by health-care professionals such as nurses, pharmacists, and doctors.

The functionality of a HMIS should guarantee that the right information is available to the right people at the right time. Improving healthcare quality is a worldwide issue, and using HMIS functions as a means of doing so is a viable option. Health care may be required to ensure social well-being and the protection of the public interest across the country. Data frameworks provide more prominent comfort to patients and clinicians through an electronic database, as evidenced in the advent of preventative and curative health services. The importance of information systems in the health sector has grown in recent years, since they help to improve the efficiency and efficacy of administering health care to the general population.

Integrated software organised for recording data in various hospital sections and ensuring that the systems perform efficiently, handling workflow of normal health services, and supporting clinical, administrative, and financial data management make up a HMIS. HMIS

functions, on the other hand, refer to the hospital management information system's appropriateness and efficacy in data gathering, processing, and data quality in order to ensure the smooth flow and efficiency of hospital operations. HMIS features are designed to enable high-quality, efficient, patient-centered care, as well as the administrative and managerial activities that go along with it. HMIS features have been found to reduce the cost of high-quality treatment and the time it takes to access patient information.

The advantages of a hospital management information system include simplified operations, greater control and administration, higher patient care, cost control, and increased profitability. HMIS is becoming an increasingly vital part of patient care in today's environment. It provides the right information to the right people at the right time in the right location. The HMIS provides answers to patient care and assists them in making informed decisions. HMIS has become more vital to the healthcare system, owing in part to the growth of communication and digital applications during the preceding two decades. As a result, the HMIS system is a recent breakthrough in the healthcare sector.

Furthermore, HMIS has various advantages, including reduced mistakes, greater speed of care, accuracy, and lower health expenditures. HMIS can readily resolve these concerns because traditional paper-based medical records are cumbersome and difficult to maintain. To put it another way, HMIS is focused mainly with the patient, as well as medical and nursing treatment, as well as the associated administrative challenges.

FUNCTIONALITIES OF THE SOFTWARE

ADT / REGISTRATION

The Patient Appointment, Registration, Admission, Discharge, and Transfer module is largely concerned with patient appointments, registration, admission, discharge, and transfer. The patient can schedule an appointment with the hospital, fill out a registration form, and receive a unique Patient ID number (which serves as a permanent reference number for the patient) as well as a unique visit ID number (Changes with each visit of the patient). The patient's socio-demographic profile, including the patient's name, Patient ID number, Visit ID number, and age/sex, is displayed on the title bar of every screen after routine registration details have been submitted in the system. The module makes bed reservations, admissions, and transfers easier, depending on availability and other

considerations such as normal discharge, housekeeping, and so on. The module assists the user in creating a complete record of all patients, including their personal and medical information, based on defined reference criteria.

BILLING

The Billing module is responsible for billing charges related with hospital services. It covers registration, services/packages, bed occupancy, pharmacy/material goods, blood bank, Operation Theater, diet, and ambulance billing for outpatients and inpatients, among other things. The Billing module also handles the financial clearances required at various stages for using hospital services/facilities.

The billing module assists the hospital in managing corporate, insurance, and hospital insurance accounts, as well as billing patients in each category in accordance with contract parameters.

NURSING

The Nursing module allows the user to keep track of inpatient activities and keep track of progress comments. Viewing service/pharmacy orders, placing service/pharmacy orders, revoking a patient discharge, recording/amending a patient's temperature, pressure, and pulse readings, administering drugs, and transferring a patient from one nursing station to another are all functions that the Nursing module can perform.

OPERATION THEATRE (OT)

The Operation Theater (OT) module allows users to process and monitor data and services in the operating room. Pre-operation and post-operation notes are also kept in the Operation Theater module. OT also allows for the recording of anaesthetic notes, OT checklists, and ward checklists, among other things.

CONSULTATION

The module enables the user to access patient details such as the doctor's real examination of the patient, the history that was recorded, and the results of the physical examination. Doctors can process and report clinical service information and consultation notes using the clinical documentation capability included into this module. Access to a patient's medical

file and treatment information is also made possible through this. Using this module, the consulting physician might request admission for an outpatient.

SCM

The Windows-based, user-friendly Service Center Manager (SCM) module of the HIS is available. You can keep track of the service orders and schedules kept at the service centres inside a hospital using the Service Center Manager module. You can view the specifics of servicing schedules with this module. You can set up the staff members' daily working schedules and hours using this module. This module can also be used to configure the capacity and unavailability of service centres.

LABORATORY INFORMATION SYSTEM (LIS)

The Laboratory Information System (LIS) module helps the user manage every aspect of a clinical laboratory in a hospital and makes it easier to maintain comprehensive result histories and track numerous samples.

BLOOD BANK

Users can manage blood inventory, blood orders, donor and recipient information, record blood test results, and test and cross-match blood units in the hospital's blood bank with the use of the Blood Bank module.

MRD

The MRD Folder is a physical collection of patient-related documents, either from the HIS system or outside of it, assembled in a physical folder to track the patient's medical history, to aid in diagnosis and treatment, and to be used as evidence in medical litigation or for study. This is kept in the hospital's Medical Records Department (MRD). If a patient's medical records are deemed to be of interest to the hospital by the user, the patient is given one MRD Folder volume at the time of their first visit. If the patient's current MRD Folder volume is unable to accommodate more paper documents, further MRD Folder volumes can be established for them.

SECURITY

Assigning user roles and privileges and keeping track of all network activity are both made easier by the Security module for the administrator. It assists in compiling a complete record of all roles and users of every network module, as well as all activity, including log-ins and log-offs, and privileges given to each role and user.

DICOM VIEWER

a flexible DICOM viewer with an easy-to-use interface and the most popular tools for manipulating DICOM pictures.

LITERATURE REVIEW

1 A study by Garg, Z. (2013) showed that the first and most significant aspect of installing a hospital information system that has a positive impact is patient (customer) joy when waiting times are decreased. This allows them to achieve a level of satisfaction from which patients look forward to continue their therapy gladly. When the patient's waiting time is reduced, the patient is automatically sent to the next stage, which is the admission procedure. Improvements in technology will drive great development in the healthcare sector in the future, reducing administrative burdens while improving patient quality and satisfaction.

2 According to a study by Ashraf, W. (2014), the implemented hospital information system (HIS) may enhance staff work processes, reduce the risk of error, and improve healthcare quality by boosting communication in nurses' work and increasing their precision in everyday activities.

3 A study shows by Jenkinson, F. (2013) that HIT also improves administrative efficiency by reducing paper work by removing the requirement for paper-based records. It improves healthcare by reducing medical mistakes and ensuring that all healthcare practitioners have access to accurate and timely data. Health information technology, in general, is becoming more widely recognised as the most promising instrument for enhancing the overall quality, safety, and efficiency of the health-care delivery system.

4 A study by Kumar, V. (2011) showed that the use of health information technology is helping to improve the quality, safety, and value of health care. The extensive use of emr systems in recent years has improved health, decreased medical mistakes, and increased patient safety. Effective EMR installation and networking saves more money in the long run by enhancing health-care efficiency and safety. For example, chronic disease prevention controlled by health-information systems might save money while also improving health and other societal benefits. Acceptance and availability of emr, electronic health records, and personal health data through

clinical information systems are critical to providing high-quality, safe medical treatment to the public at all times.

5 A study of Alkins, M., & Binka, O. (2015) shows that from admission to diagnostic and medical support services, the modern healthcare centres rely on wide range of software applications. Proper implementation of HMIS modules will definitely lead to improved quality of patient care, communications, productivity and reduced costs, chance of errors.

6 A study by Ayodele, K. (2014) shows that the quality of the information processing in nursing strongly increased after the introduction of a nursing information system.

7 A study of Basu, M. (2013) shows that Computerized POE substantially decreased the rate of non-missed-dose medication errors. A major reduction in errors was achieved with the initial version of the system, and further reductions were found with addition of decision support features.

8 A study of Hussain, R. (2021) reveals that implementing HMIS is the best course of action for managing hospital services effectively, but as this study indicates, it has both advantages and disadvantages. The study's findings indicate that the supply of a paperless system, ease of data analysis, and convenience of reviewing patients' medical histories are the three most often cited benefits of HMIS among physicians. The main perceived drawbacks of HMIS, on the other hand, were its higher time requirements, which would make clinical work more difficult to manage in the event of an increase in patient volume. Physician confidence in the system is generally increased through formal training and prior use, and the presence of helpful technical staff is also essential in this regard.

9 A study shows Skobelev, O. (2011) that laboratory information management system is the most effective, adaptable, and versatile management instrument for boosting the effectiveness and calibre of analytical studies in labs that work in many fields of endeavour. Analytical laboratories can validate their capabilities through the use of laboratory information management systems.

OBJECTIVE

1- To determine the effect of HMIS functionalities on the performance of a hospital.

RESEARCH QUESTIONS

The study aims to answer the following questions:

1- What are the effects of HMIS functionalities on the performance of a hospital?

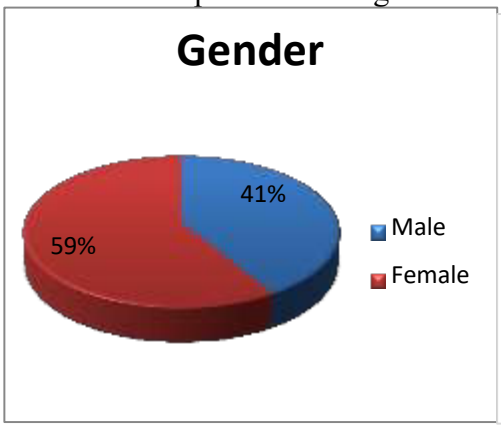
METHODOLOGY

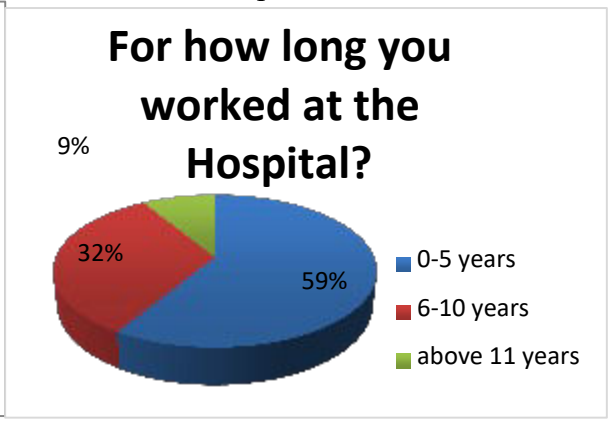
- **Target Population-** End users of HMIS software like Doctor, Nurse, Laboratory and pharmacy department, Administration staff.
- **Study area and design:** - The study was based on primary data. This study was conducted among the users of KareXpert software.
- **Analysis tools and techniques: -** Charts, Graphs is used for visualisation, SPSS is used for Statistical analysis.
- **Sample size:** - Total 140 questionnaire were distributed among end users based on the no. of users (doctors, nurse, laboratory, pharmacy and administrative department). But we got responses from 92 end users.
- **Data collection: -** Data has been collected through online questionnaires. Except the background information of the user, the likert scale was used to ask questions to the end users.

ANALYSIS

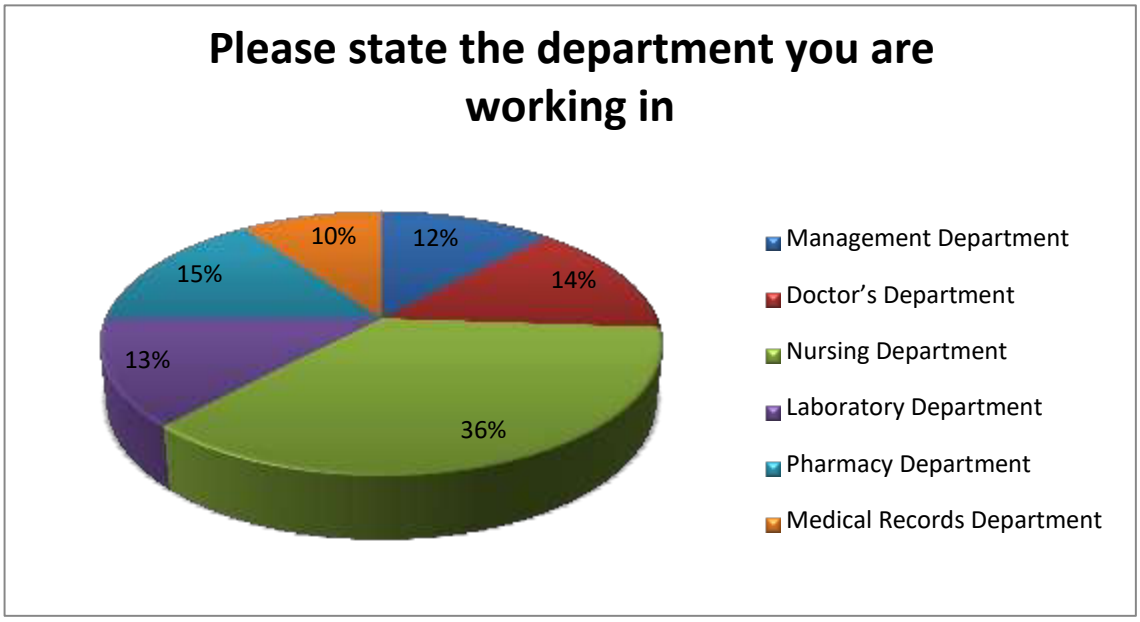
Background Information

These charts explain the background information of the respondents.





The total respondents were 92. It is clear that 56% male and 44 % females were participated in this study. Out of which 40% respondents are of 20-30, 38% are between 31-40 years of age, 16% respondents are between 41-50 years of age and 6% are above 51 year of age.



Majority of the respondents (36%) belong to the nursing department, 14% of the respondents were belongs to the doctor's department and remaining respondents (50%) were belongs to the other departments (management, laboratory, pharmacy, medical record department).

Reliability Statistics

Cronbach's Alpha	N of Items
.871	13

Reliability statistics for likert scale questions founded Cronbach's Alpha value is 0.871 which shows that data is completely reliable for further analysis.

DESCRIPTIVE STATISTICS

Perception of HMIS end user on the functionalities of the software in a tertiary care hospital	Score (Mean)	Answer
The HMIS function provides accurate information about the patients at the hospital.	3.917	Agree
The HMIS function provides up-to-date information about the patients at the hospital.	3.720	Agree
The HMIS functions facilitate better coordination of the healthcare services at the hospital.	3.211	Agree
The HMIS functions have enabled provision of feedback on patient care at the hospital.	3.523	Agree
The HMIS functions at the hospital are user friendly and reliable.	2.812	Neutral
The HMIS functions at the hospital are responsive to user requirements.	3.174	Agree
HMIS functionalities have led to improved processes/operations at the Hospital	3.124	Agree
HMIS functionalities have led to improved patient turnaround time.	3.257	Agree
HMIS functionalities have led to improved financial control at the Hospital.	2.645	Neutral
HMIS functionalities have led to growth in revenue at the Hospital.	2.897	Neutral
HMIS functionalities have improved work coordination and teamwork at the Hospital.	3.817	Agree
HMIS has led to improved patient satisfaction at the Hospital.	2.564	Neutral
HMIS has led to improved customer experience at the Hospital.	2.781	Neutral
Grand Total	3.21	Agree

The descriptive statistics shows that majority of the respondents are agreed on most of the questions while half of the users have neutral response towards the statement (The HMIS functions at the hospital are user friendly and reliable, improved financial control at hospital, patient satisfaction, customer experience and lead in growth in revenue).

CHI SQUARE TEST

Department	Positive perception	Negative Perception	Total
Management	5	6	11
Doctor	8	5	13
Laboraotry	8	4	12
Nursing	30	3	33
Pharmacy	12	2	14
MRD	7	2	9
Total	70	22	92

Department	Positive perception	Negative Perception	Total
Management	8.37	2.63	11
Doctor	9.89	3.11	13
Laboraotry	9.13	2.87	12
Nursing	25.11	7.89	33
Pharmacy	10.65	3.35	14
MRD	6.85	2.15	9
Total	70	22	92

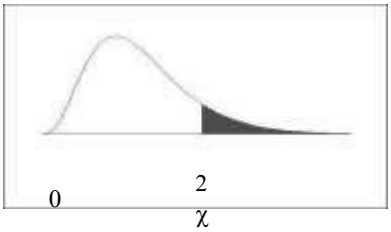
Note: The expected frequencies refer to the values we would have expected, given the total numbers of 70 and 22 users in the two groups, if the null hypothesis , stating that end users have negative perception to the functionalities of the hospital.

Df (Degree of Freedom) = 5

x2 = 12.482498165615

- Since our calculated chi-square, 12.482498165615
- We conclude that the users have positive perception towards the functionalities of the Hospital.

Chi-Square Distribution Table



Chi-Square (χ^2) Distribution

Degrees of Freedom	Area to the Right of Critical Value									
	0.995	0.99	0.975	0.95	0.90	0.10	0.05	0.025	0.01	0.005
1	—	—	0.001	0.004	0.016	2.706	3.841	5.024	6.635	7.879
2	0.010	0.020	0.051	0.103	0.211	4.605	5.991	7.378	9.210	10.597
3	0.072	0.115	0.216	0.352	0.584	6.251	7.815	9.348	11.345	12.838
4	0.207	0.297	0.484	0.711	1.064	7.779	9.488	11.143	13.277	14.860
5	0.412	0.554	0.831	1.145	1.610	9.236	11.071	12.833	15.086	16.750
6	0.676	0.872	1.237	1.635	2.204	10.645	12.592	14.449	16.812	18.548
7	0.989	1.239	1.690	2.167	2.833	12.017	14.067	16.013	18.475	20.278
8	1.344	1.646	2.180	2.733	3.490	13.362	15.507	17.535	20.090	21.955
9	1.735	2.088	2.700	3.325	4.168	14.684	16.919	19.023	21.666	23.589
10	2.156	2.558	3.247	3.940	4.865	15.987	18.307	20.483	23.209	25.188
11	2.603	3.053	3.816	4.575	5.578	17.275	19.675	21.920	24.725	26.757
12	3.074	3.571	4.404	5.226	6.304	18.549	21.026	23.337	26.217	28.299
13	3.565	4.107	5.009	5.892	7.042	19.812	22.362	24.736	27.688	29.819
14	4.075	4.660	5.629	6.571	7.790	21.064	23.685	26.119	29.141	31.319
15	4.601	5.229	6.262	7.261	8.547	22.307	24.996	27.488	30.578	32.801
16	5.142	5.812	6.908	7.962	9.312	23.542	26.296	28.845	32.000	34.267
17	5.697	6.408	7.564	8.672	10.085	24.769	27.587	30.191	33.409	35.718
18	6.265	7.015	8.231	9.390	10.865	25.989	28.869	31.526	34.805	37.156
19	6.844	7.633	8.907	10.117	11.651	27.204	30.144	32.852	36.191	38.582
20	7.434	8.260	9.591	10.851	12.443	28.412	31.410	34.170	37.566	39.997
21	8.034	8.897	10.283	11.591	13.240	29.615	32.671	35.479	38.932	41.401
22	8.643	9.542	10.982	12.338	14.042	30.813	33.924	36.781	40.289	42.796
23	9.260	10.196	11.689	13.091	14.848	32.007	35.172	38.076	41.638	44.181
24	9.886	10.856	12.401	13.848	15.659	33.196	36.415	39.364	42.980	45.559
25	10.520	11.524	13.120	14.611	16.473	34.382	37.652	40.646	44.314	46.928
26	11.160	12.198	13.844	15.379	17.292	35.563	38.885	41.923	45.642	48.290
27	11.808	12.879	14.573	16.151	18.114	36.741	40.113	43.194	46.963	49.645
28	12.461	13.565	15.308	16.928	18.939	37.916	41.337	44.461	48.278	50.993
29	13.121	14.257	16.047	17.708	19.768	39.087	42.557	45.722	49.588	52.336
30	13.787	14.954	16.791	18.493	20.599	40.256	43.773	46.979	50.892	53.672
40	20.707	22.164	24.433	26.509	29.051	51.805	55.758	59.342	63.691	66.766
50	27.991	29.707	32.357	34.764	37.689	63.167	67.505	71.420	76.154	79.490
60	35.534	37.485	40.482	43.188	46.459	74.397	79.082	83.298	88.379	91.952
70	43.275	45.442	48.758	51.739	55.329	85.527	90.531	95.023	100.425	104.215
80	51.172	53.540	57.153	60.391	64.278	96.578	101.879	106.629	112.329	116.321
90	59.196	61.754	65.647	69.126	73.291	107.565	113.145	118.136	124.116	128.299
100	67.328	70.065	74.222	77.929	82.358	118.498	124.342	129.561	135.807	140.169

DISCUSSION

The study found that boosting the efficiency of the hospital's supply chain resulted in better strategic decisions being made as a result of the hospital's management information system. Revenue had increased, according to the findings of the study. According to satisfaction surveys, the Hospital has seen an increase in patient satisfaction with the services it provides over the years, particularly in terms of patient turnaround time. Patient satisfaction is becoming an increasingly important tool in the growing trend of healthcare professionals being held accountable.

Hospital management information system was connected to greater work coordination and cooperation, considerable gains in labour cost distribution, quality control, employee productivity, and more effective and efficient service delivery.

According to the study, HMIS had standardised reporting by management to support patient care and administrative applications, as well as lowering the effort and time spent by personnel such as nurses, pharmacists, and physicians on health knowledge. Furthermore, technology has been connected to the Hospital's increased turnaround time over time.

HMIS functions had also contributed to enhanced processes/operations, according to the study's findings. It also offered a structure for organising diverse data related to management, financial, and medical processes. Furthermore, HMIS features had resulted in revenue increase.

HMIS functions increased work collaboration and teamwork, according to the study's findings. HMIS also provided benefits such as simplified operations, greater management and administration, higher patient care, cost control, and increased profitability. Furthermore, the hospital's implementation of HIMS resulted in a reduction in health-care costs.

Patient satisfaction was also increased as a result of HMIS functions, according to the study's findings. Similarly, HMIS improved the Hospital's customer experience, patient happiness, and service delivery efficiency, resulting in a rise in the number of patients treated and, eventually, revenue growth.

HMIS functions resulted in enhanced patient and employee safety, greater income due to paperless operations, and efficient billing and official document creation processes that were completed in a timely way.

CONCLUSION

According to the findings of the study, the Hospital has improved its performance over time as a result of the services/procedures provided at the institution. This was accomplished by increasing income and improving patient care. Patient satisfaction with the services provided had increased, as had work collaboration and teamwork. There had also been improvements in the efficiency of health-care delivery, the elimination of medical errors, and the efficient conveyance of information to patients.

The study also found that HMIS functions resulted in faster patient turnaround times and a significant reduction in red tape in the hospital, resulting in more effective service delivery. As a result of HMIS functions, work collaboration, teamwork, health care cost reduction, revenue growth, and patient happiness have all increased.

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Annexure 1

Informed Consent

My name is Komal, a student of IIHMR Delhi, pursuing a PGDM course in Hospital and healthcare management. I am carrying out a study on the Perception of the HMIS End Users on the Functionalities of the Software on a Tertiary Care Hospital. To achieve this, I am kindly requesting to participate in this academic research by filling out the questionnaire.

· Participation in this study is fully voluntary.

· The information obtained will be used for academic purposes only and will never be used against you.

· The information got from you will be kept confidential.

Your participation will be highly appreciated.

ANNEXURE 2

QUESTIONNAIRE

Demographic Details

1- Gender

2- Age

3- Please state the department you are working in?

4- For how long you worked at the Hospital?

Please tick on the following statement regarding the HMIS functionalities. Rate on a 4- point scale where: 1- Strongly disagree, 2-Disagree, 3- Agree, 4- Strongly agree

1- The HMIS function provides accurate information about the patients at the hospital.

2- The HMIS function provides up-to-date information about the patients at the hospital.

3- The HMIS functions facilitate better coordination of the healthcare services at the hospital.

4- The HMIS functions have enabled provision of feedback on patient care at the hospital.

6- The HMIS functions at the hospital are user friendly and reliable.

7- The HMIS functions at the hospital are responsive to user requirements.

Please tick on the following statement regarding the HMIS effect on hospital performance. Rate on a 4- point scale where: 1- Strongly disagree, 2- Disagree, 3- Agree, 4- Strongly agree

1- HMIS functionalities have led to improved processes/operations at the Hospital

2- HMIS functionalities have led to improved patient turnaround time.

3- HMIS functionalities have led to improved financial control at the Hospital

4- HMIS functionalities have led to growth in revenue at the Hospital

5- HMIS functionalities have improved work coordination and teamwork at the Hospital

6- HMIS has led to improved customer experience at the Hospital

7- HMIS has led to improved patient satisfaction at the Hospital

8- HMIS has led to improved safety of patients and staff.