Unit - III

Application of computers in Pharmacy :-

Drug information storage and retrieval

Q Define term Database ?

Ans :- A database is a data structure which stores information in an organised manner.

So that it can be easily accessed, retrieved, managed & updated electronically from a computer system when needed.

Drug Database :- OR - Pharmacy drug data base :-

As the name indicated storage of information regarding Pharmacy.

For e.g :- Information regard, drugs medication etc. in simple words we can say that drug information data base are the sites where information about drugs & medication are stored.

- In pharma sector - one of the most commonly or largest used drug database is complied by FDA (Food And Drug Administeration)

* FDA - is a Federal agency (or Constitutional authority) that overlear & controll all the medications in U.S.; which includes :-

* OTC (over the counter) medication
* Prescriptional medications
* Dietary Supplements
* Vaccines.

e.g:- Drug Bank :- (Stores 100% information regarding drugs.

Freely accessible - online available.

(Search - about drug/disease - information)

Online drug data base :- Gives information in two ways.

Information on drug
↓
Detailed information regarding drugs
Chemical, pharmacological & Pharmaceutical Action.

Information Drug Sequency About :-
↓
Structure
Pathways
SAR

Drug Bank is widely used by :-

* Drug industry
* Doctors
* Students
* Pharacist / chemist
* General Public.

E-prescribing or electronic Prescriptions :-

It is a computer base electronic Prescription or we can say that Digital mean of Prescribing.

The electronic transmission of drug Prescribtion from Doctor's or other Prescriber's computer, to the pharmacy's Computer.

Improved patient Safety :- (Secure)

→ It replaces the paper prescriptions (Which can be tampered or lost)

* Time Saving process.

→ It reduces the errors related to poor handwriting or any other nomenclature.

→ E-prescribing reduces the serious drug errors by up to 86%.

→ With E-prescription we can know about the historical data of Patient.

→ Educational capabilities :-
E-prescribing is a system via which we can query about patient allergies adverse drug reactions etc.
It give education and awareness to patient.

→ Health care prescriber can add new medication list easily.
Can select the pharmacy where the medication is available.

→ Makes it easier to verify insurance.

→ Via EP system it becomes very easily to choose medications that will be covered by patient's drug benefit.
Enhanced the patient medication Adherence

→ Once a doctor give a prescription to a patient (hand written prescription). there is no effective way to track weather the prescription was filled or not. Patient's often forget to fill the prescription.
∴ E-prescribing allows the physicians to verify wheather patients fill their prescription. and counsel patients on medication management if they haven't it.

Improved Pharmacy work flow :-

→ E-prescribing also been shown a stream line prescription processing and reduce wait times at local Pharmacies.

→ Enchanced safety, ~~shorter~~ shorter the wait time, yield greater

patient satisfaction with the services provides by Pharmacy. Ultimately resulting in Customer retention & increased revenue.

(EP) Electronic Discharge System :-

Electronic discharge summary or system is a nobel method to discharge a patient from hospital. This system eleminate possible sources of error that may result when scanning or faxing paper based discharged summaries.

This is a user friendly system that tracks patients, streamlines processes and help manage hospital resources.

It recomends appropriate medications and dosage. eleminating discharge medication errors and improving patient safety.

Dual to these improved efficiences patients are proven to be discharged faster.

Benefits :-

① Save money time & bed space. It's not just health professionals that will save time with this electronic discharging system even patients too save time.
As a result :- patient can save time usually spent waiting to pick up medications.

* It is a fully auditable and can be used to display real-time bed occupancy status to hospital management.

Enables doctor's to rapidly seconds all diagnosis treat-ment, medication at the point of care.

For e.g:- if you discharged from hospital and after few days due to some medical emergency again get admitted then they can easily find you medical history through this electronic discharge summary.

* Overcome the deficiencies of paper based discharge summary :-

Because paper based discharge summary is often illigible, incomplete recived too late. Sometimes patient forgot to take it with him.

then this mistake leads to a serious medical agency emergency.

* While in electronic discharge system we get - Accurate data Easier for doctor to start emergy health treatment. Consultant can review and approve discharge summary even after patient left the hospital.

* Reimbursement process can be done & tasks.

Doctor will be able to get patient discharged in minutes from any computer or tablet or even through mobile technology.

Drug information storage & reterival :-

It refers to process of compiling data and information on a particular drug that can be acessed when required or can be reterived.

* Information regarding drug is stored in Drug database *

Benefits :-

Computer can display only relevant data on given drug (i.e. what actual we required).

Solve the queries of Pharmacist :-

Pharmacist can solve his/her queries regarding drug or medicament.

About there pharmacological Action, Adverse drug reaction, Drug-Drug interactions incompatibility etc.

Save time :- Computerised information Saves time and provides thorough information.

Easily to Retrive or Access :- with the help of internet you can store and also can retrive data from anywhere in the world.

There are following information reterival systems :-

① Online information reterival ② CD-Rom information reterival
③ OPAC ④ WEB information reterival

① Online information retrival :- Searching & analysing data through various Databases.

e.g :- Online we can know about :- Availability of doctors, List of Patient in hospital, status of Billing, List of Patients in hospitals.

② CD-ROM :- Retrival of that information which has already been stored in CD-ROM. This type of information can be accessed when required & can't be modified or updated.

③ OPAC :- Stands for ONLINE PUBLIC Acess Catelog Used of Universities or colleges in this labrary.

④ WEB Information Reterival :- It refers to world wide web Search. Which is most commonly used by anyone, any where and any time. e.g :- Google.

Examples :-

① MEDLARS (In 1964)
(Medical literature analysis and Reterival System)
It is a computerized medical Information reterival System Creted by National Liabrary of Medicine.
In 1964
→ It contain vast information i.e. 25000 articles, books & Journals.

② MEDLINE (MEDLARS ONLINE)
In 1971 National liabrary of medicine developed MEDLINE which is a advance version of MEDLAR

How computer is use full in Pharmacokinetics :-
→ Pharmacokinetics works on the Principle of ADME i.e. (Absorption, Distribution, Metabolism & elimination).
→ It is difficult to carry out exact mathematical evaluation in Pharmacokinetics because biological ~~[illegible]~~ process are very complex.
→ computer can solve this complex Calculation.

Mathematical model in drug design :-

Drug design :- It is the inventive process of finding new medications. Mostly used in R&D (Research & development).

Drug design frequently relies on computer modeling techniques. This type of modelling reffered to as computer added drug design.

Drug design uses computational approaches to discover, develop & analyse drugs.

→ Time Saving / easy / Sharing is possible.

→ Study About RNA & DNA coding

⟶ Virtual — Compound — Calculation — SAR Analysis
Screening design

Drug target Interaction ← ADME Model ←

Mathematical models are frequently used in drug development

What Do you mean by term mathematical model :-

A mathematical model is a decription of a system using mathematical concepts & language. The process of developing a mathematical model is termed as mathematical modeling.

Mobile technology and Adherence Monitoring :-

With the use of mobile technology we can monitor the patient Adherence.

1. Mobile technology provides opportunities for pharmacist and other health care professional to help improve and acess patients medication adherence.

2. With the use of mobile device technologies we can keep track of one's own health and wellness with the help of different software applications.
e.g:- Book my Doctor, Portable and easily to use.
Text alert or reminder Alarm for Prescription which patient has to take.
With the help of mobile patient can send or receive messages from the doctors.
Can book appointment from home.
Mobile health application and devices are really making great impact in health care industry as they are able to diagnose disease and prevent the Probability of developing dangerous medical circumstances like heart disease or diabetes.

Adherence monitoring :-
* Monitoring of Patient that how much he is improving.
* Poor adherence can result in serious health conseq-uencies.
Adherence monitoring involving two activities namely, tracking does and monitoring side effects. (Is there any improvement in patient or not).
The system of Adherence focuses on the "Five rights"
→ ① right patient
→ ② right medication
→ ③ right dose
→ ④ right time.
→ ⑤ right route of Administeration.

e.g:- Smart pill Bottles :- Give Alarm at the time of medication. (Automatically Pill Sensor)
Mobile Apps :- e.g:- We can major our B.P. via using mobile app.

Diagnostic System :-

① CADe :- Computer - aided detection also called as computer aided diagnosis (CADx) are systems that assist doctors in the interpretation (i.e. x-rays).

② ~~CADe~~ Imaging techniques in X-Rays (Lungs), MRI (Brain), Ultrasound (Stomach) diagnostic yields a great deal of information that the radiologist or other medical professional has to analyse & evaluate comprehensively a short time.

③ CAD systems process digital images for typical appearances and to highlight conspicuous sections such as possible disease, in order to offer input to support a decision taken by a professional.

Covid - 19 — Cough — X-Rays (whitish appearance) then fill with infection) - difficulty in breathing :- [ ]
e.g:- Diagnostic of Breast cancer via using CAD Systems.

Diagnosis :- Art or act of identifying a disease from its sign.

Lab Diagnostic system :- (Diagnosis in lab)
Laboratory diagnostics is a part of clinical diagnostics which studies and evaluates physiological state of the body, cellular and chemical blood composition, Biological properties of tissue and fluids.

→ To find the main reason of illness with the help of different lab diagnostic System. (i.e. what kind of infection is these - bacteria, viral, fungal of other infection disease.

→ i.e. Diagnosis made by chemical, microscopic, microbiological, Immunologic, Pathologic study of secretions, discharges, blood or tissue.

This LAB diagnosis system help to find out the cause, Plan of treatment or check to see if the treatment is working.

Patient Monitoring System (PMS) :- Can be defined as System which helps the doctor to :-

Repeated continous, observation & measurement.

(Some times patient is in ICU the

→ Physiological function

→ life supporting system.

Purpose - Crutching, management -

→ Decision

Which kind of therapy should be given (therapeutic assessment)

help the doctor to take Accurate decision.

Five Categories of Patients who needs Physiological monitoring :-

① Patient with unstable Physiolation regulatory System :-

e.g :- a patient whose respiratory system is suppressed by a drug overdose or anesthesia.

Covid-19
[Respiratory System - Corona virus]
isolation - Physiological monitoring

② Patient with suspected life threatning condition.
e.g:- Patient who has finding acute myocardial infection (Heart attack).
life support system - Ventilator.

③ Patient at high risk of developing life threatning condition.
e.g:- Open heart surgery.

④ Patient in a critical physiological state.
e.g:- Shock, Multible trauma

⑤ Mother & baby during labour & delivery process.

PMIS :- Pharmacy management Information System :-
Deals about Drugs in Pharmacy are up to date or not. New drugs / Regarding new disease life supporting system are available or not.

→ * PMIS - Deals with maintaince of drugs consumable in the pharmacy units. System will ensure availability of sufficient quantity of drugs & consumable material for the patient.

→ Enhance the efficiency of clinical work ease the patient convenience and process drug prescription effectively.

Importance of PMIS :-
A good PMIS provides necessary information to make sound decisions in the pharmaceutical secter.

Supply of drugs / Most consuming drugs information regarding drug resistance, availability of medicines & laboratory supplies (Supply management).
Patient Safety, product registration, quality efficacy.

ADM :- Automated Dispensing machine or Automated Dispensing cabinet. (ADC)
Computerised drug storage device.
ADC allow medications to be stored & dispensed near the point of care while controlling and tracking drug distribution.
- One of the biggest benefit of these machines is faster service, Customers do not have to wait as long to receive medication and machine can fill the prescription much faster than a human can.
→ Medication are securely locked in Automated dispensing machines and all dispensing bills are traced by machine software.

Only certain pharmacy staff members are trained on how to use, open, restock the machines, reducing the potential of medication theft or human error.
e.g:- ADM
Sp 200 Robotic prescription dispensing System.
A full automated robotic prescription system. It accepts prescription dispensing instructions from pharmacy computer & deliver at a rate of up to 100 prescription per hour.
SP 200 Robotic.