Summer Training Report

on

Comparative Assessment of Discharge Procedure Based on NABH Guidelines

Submitted By

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MBA Hospital and Health Management

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TO WHOMSOEVER MAY CONCERN

This is to certify that **Dr. Akanksha Agrawal**, student of MBA Hospital and Health Management from the IIHMR University, Jaipur summer training from April to June 2020.

The student has successfully carried out the study designated to her during the summer training and her approach to the study has been sincere, scientific, and analytical.

The summer training is in fulfillment of the course requirements.

I wish her success in all future endeavours.

Dr. P.R Sodani
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IIHMR University, Jaipur

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CERTIFICATE BY SCHOLAR

This is to certify that the summer training titled ***"Comparative Assessment of Discharge Procedure based on NABH Guidelines"*** submitted by **Dr. Akanksha Agrawal,** enrolment no. 0870 under the supervision of **Dr. Anshuman Sewda.** This summer training is in partial fulfillment of the course required for award of MBA Hospital and Health Management of the University carried out during the period from April toJune 2020 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

ACKNOWLEDGMENT

It gives me immense pleasure to express the deepest sense of gratitude and sincere thanks towards my highly respected mentor **Dr. Anshuman Sewda, Assistant Professor, IIHMR University Jaipur** for his valuable guidance, understanding and patience throughout my postgraduate study.

I am grateful to almighty for giving me the strength to successfully finish my work and for sustaining my efforts which many a time did oscillate.

I also acknowledge with deep sense of reverence, the gratitude I feel towards my parents for standing by me and keeping in faith in all my decisions.

I extend my gratitude towards **the IIHMR University, Jaipur** for giving me the opportunity to embark on this project.

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PART - 1

Comparative Assessment of Discharge Procedure Based on NABH Guidelines

1. ABSTRACT

National Accreditation Board for Hospitals & Healthcare Providers (NABH) defines discharge as a process by which a patient is shifted out from the hospital with all concerned medical summaries ensuring stability. Patient discharge a protracted procedures. Time taken in the discharge procedure by a hospitals is an important indicator of their quality of care and patient satisfaction.

The study was observed in the patient of General medicine and Surgery department of hospital in Shrinagar . Their documentary process are compared with NABH AAC (Access, Assessment, Continuty of care) 13 and 14.

In a time-motion study, a straight and steady observation of procedure is performed, Video clips can be, watched to record the time taken for the procedure. The study was implemented in a hospital in Pune city, in which discharge process of 300 patients was observed. Additionally, the discharge process flow of 280 patients admitted at a hospital in Ludhiana city was compared with theNABH criteria or standards.

The results indicate that the steps of discharge procedure of tertiary hospital in which study was carried out shows delay in their process when compared with the NABH standards.

Number of suggestion als mentioned to improve patient satisfaction level.

2. INTRODUCTION

Discharge procedures can be defined as, “the process of activities that involves the patient and the team of individuals from various disciplines working together to facilitate the transfer of the patient from one environment to another”.

The patients and their relatives eagerly wait for the discharge procedure in the hospital. This process takes place when the patient no longer needs to stay admitted at the hospital for healthcare.

It does not mean that you are fully healed or recovered; however you have recovered enough to go home. Discharge of patient may also take place when they are reffered to another hospital for better treatment, or in a case when patients do not afford the treatment and want to go home, so there are many reasons for the discharge of the patient.

Types of discharge processes:-

- Planned :- Patients complete initial, the actual management of hospitals and now he/she need not be under the direct supervision of the hospitals.

- Unplanned :- A condition when the sudden or acute transfer of patient should be done without following any documentation due to emergency
  or, the Patient is leaving against medical device due to their reasons or want to go home and request a doctor to discharge his/her immediately. Also called LAMA (Leave against medical advice) or (Discharge against medical advice)

Other categories of patient for discharge process are :-

- Self-Payment :- Patients do their payment via cash/debit/credit/UPI
- Insured Patient :- Patient who has health insurance to cover the cost of the treatment.

Steps involved in discharge procedure :-

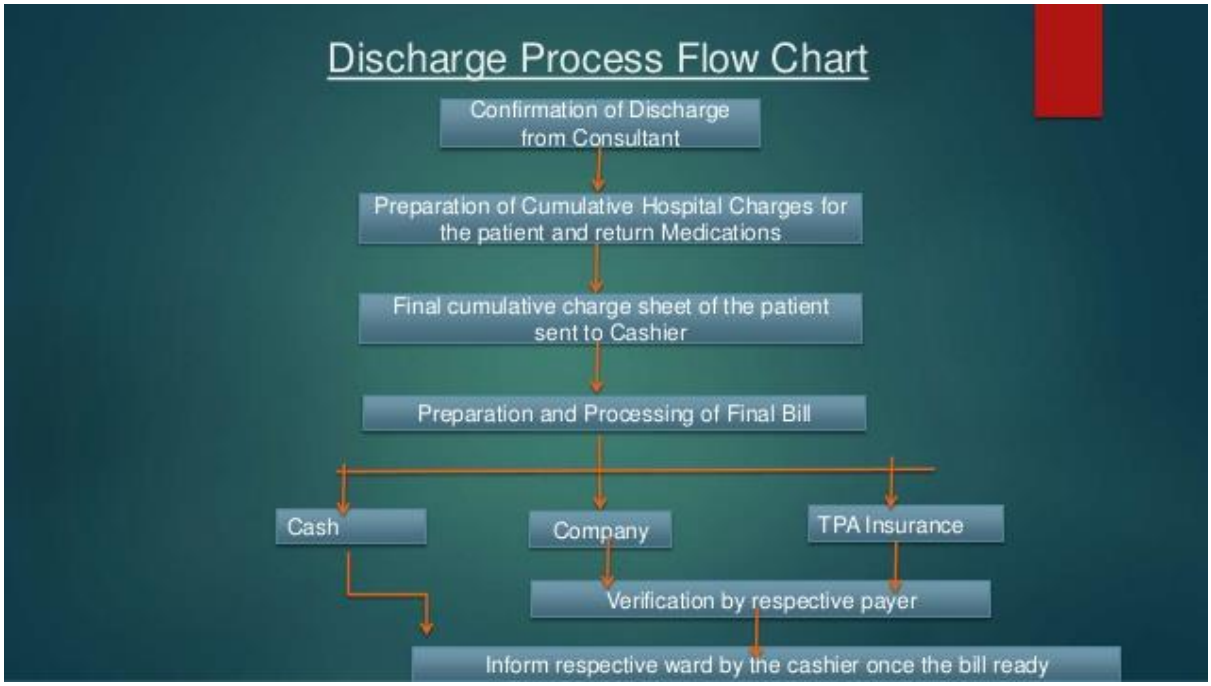

Figure 1. Discharge process flow chart

Fig. 1 shows the basic steps of discharge procedure that every hospital should follow.

The discharge process is an important tool for maintaining quality management since it affects patient satisfaction.

A limit or any extent of which the patient is happy with the treatment or healthcare system is the patient satisfaction. It is an important indicator to measures the quality of healthcare.

If there is any delay in the procedure related to patient treatment protocol, they will feel uncomfortable, get angry, and effect in their health as well. So, the discharge procedure must take place within the given standard time that will help not only patients but also help to health workers by making their work easy and constantly maintain the chain of all patient's treatment.

Now the question is what is the standard time?

NABH is a consultant board of QCI (Quality council of Inida). This will give structure for assurance of quality and their improvement for the hospitals.

These standards reflect the following two major aspects of health care delivery :-

- **Patient-Centered**
  - Access, Assessment and Continuity of Care (AAC)
  - Care of Patients (COP)
  - Management of Medication (MOM).
  - Patient Rights and Education (PRE).
  - Hospital Infection Control (HIC)

- **Organization Cantered**
  - Continuous Quality Improvement (CQI).
  - Responsibility of Management (ROM)
  - Facility Management and Safety (FMS).
  - Human Resource Management (HRM).
  - Information Management System (IMS).

In this report, we are discussing the AAC since in this there is a standard description for the discharge process.

Under AAC, there are major 14 standards in which AAC 13 and 14 are based on the discharge process.

AAC 13 is the organization has a documented discharge process.

With objective elements:-

- The patient's discharge process is planned in consultation with the patient and/or family.
- Documented procedures exist for coordination of various departments and agencies involved in the discharge process (including medico-legal and absconded cases.
- Documented policies and procedures are in place for patients leaving against medical advice and patients being discharged on request.
- A discharge summary is given to all the patients leaving the organization (including patients leaving against medical advice and on request).
- The organization defines the time taken for discharge and monitors the same.

AAC 14 is an Organisation that defines the content of the discharge summary.

With objective element-

- A discharge summary is provided to the patients at the time of discharge.
- Discharge summary contains the patient's name, unique identification number date of admission and date of discharge.
- Discharge summary contains the reasons for admission, significant findings and diagnosis, and the patient's condition at the time of discharge.
- The discharge summary contains information regarding investigation results, any procedure performed, homeopathic analysis and evaluation, medication(s) administered, and another treatment is given.
- Discharge summary contains follow-up advice, medication, and other instructions in an understandable manner.
- Discharge summary incorporates instructions about when and how to obtain urgent care.
- In case of death, the summary of the case also includes the cause of death.

NABH standards give standard time for completing discharge procedures with standards step should be taken.

Preparation of discharge summary- should be done within 30 minutes

Preparation of bill – should be done within 30 minutes

Return of unused medicine to a pharmacy- should be done within 30 minutes

Clearance from all department should be done within 60 minutes

Bill settlement and approval – should be done within 30 minutes.

Total time taken in the discharge procedure should be 180 minutes under NABH standards.

If the discharge procedure was carried in tertiary hospitals with this standard time than it will give us a good percentage of patient satisfaction and thus help to maintain the quality of the hospitals.

These data we can collect by direct observation, questionnaire, semi-interview, etc., then analyze it using Turnaround time.

TAT is a Turnaround time that is time period between the beginning of the process to their competition. The concept of TAT is overlap with time that was leading and contrast with their cycle.

We can compare TAT with various metrics

- TAT with lead time
- TAT with response time
- TAT with waiting time

Reasons for delay – there are several reasons for the delay in the time taken.

- Awaiting complimentary test
- Awaiting the result of the complimentary test.
- Awaiting specialist consultation
- Due to lack in coordination of medical elated accountability

Cost of delay in discharge process

It cost business, time, money. If in a hospital there is a delay in the discharge process, patient care quality automatically decreases. Other cost includes -

- Loss in productivity
- Loss in internal information.

3. OBJECTIVE

- To study the concept of the system of the discharge process of patients.
- To compare the process with the NABH standard and evaluate it.
- To recommend suitable suggestion for improving patient satisfaction.

4. RATIONALE

Discharge procedures have a direct relation with patient satisfaction. Delay in discharge procedure leads to patient dissatisfaction and thus has an effect on the quality of the hospital. This study aims to compare the Discharge procedure of various hospitals by analyzing TAT through NABH standards to improvise or increase patient satisfaction.

5. LITERATURE REVIEW

In today's scenario, the delay in discharge hospital is the major issue in the world. the discharge procedure is the basic, compulsive procedure of the hospital and is a large process that involves many steps and thus to complete it sophistically is not that easy but is necessary to complete without delay for patient satisfaction that is an important tool to measure the quality of hospitals. For increased productivity of the hospital, it is necessary that the discharge procedure should be done under the NABH standards guidelines. To understand the cause of delay in the discharge procedure many researchers have been conducted the study on the same.

According to Soraia Aparecida da Silva, I Reginaldo Aparecido Valácio it has been seen that many of the hospitals are not following the NABH standards even they are accredited with NABH, and more than that the important consideration observed that approx. 80% of hospitals are under process for NABH accreditation.

According to Ann Hendrich, Marilyn Chow Patient satisfaction have a direct correlation with the discharge process. The three main categories they discuss to improvise this issue is to give attention in documentation, medication administration, care coordination. Changes in work processes, technologies, and unit organization and design give positive effects to improvise these issues.

Many scientists such as Sateesh Ketabi, have concluded in the department of management that hospital personnel involved identified the main factors affecting average waiting time as patients' financial problems and distance between different wards.

Other factors that could be the reason for the delay in the process are lack of proper flow of process, lack of communication. According to Laisy may the health workers get frustrated in the hospitals due to the environment of hospitals, maybe there is no proper equipment available, proper data entry is not there to maintain regular process flow.

6. METHODOLOGY

- **Study design**

  Study 1:- Type of study is observational carried in a general medicine and surgery department in Hyderabad, Srinagar hospitals.

  Study 2:- Cross-sectional descriptive type of study of 300 bedded hospital of Pune city.

  Study 3:- Observational type of study taken in 250 bedded multispecialty hospital of Ludhiana.

- **Period of study**

  Study 1 :- Three months' duration (from 1st Nov 2017 to 31 Jan 2018).

  Study 2 :- One-month duration 4th June 2012 to 4th July 2012.

  Study 3 :- The data were collected from May -June 2017.

- **Sampling**

  Study 1 :- Sample was taken from 700 cases. Out of which 60% of patients are under General Surgery and 40% under General Medicine. The study of patients was taken without regard for their gender, all will be included, and the take in time was between 9 am to 5 pm except Sunday, since Sunday has not planned for discharging patients.

  Study 2 :- A total of 300 patients were taken for a study of all types, like Insurance patients, self-payment patients & discharges against medical advice (DAMA), and then their record will be maintained for further study.

  Study 3 :- Randomly data is collected by observing 270 discharged patients from different wards to record their process for further study.

- **Data Collection**

  Study 1:- Qualitative and quantitative data then differentiate it with NABH Standards, NABH criteria (AAC. 13), (AAC.14) (AAC- Access, Assessment, Continuity of care).

  Study 2 :- Quantitative data in which time will be recorded for all types of procedures by using stopwatch with the help of nurse staff in every department with all types of patients.

  Study 3 :- Evaluate timings including discharge intimation time, billing card submission time, drugs clearance time, pharmacy clearance time, final bill intimation time, final bill clearance time, final summary time, handover time, a vacancy of room and time taken for preparation of the room for next patient were recorded for each patient to study actual time taken at each step from discharge order to the physical room vacancy by the patient.

7. FINDINGS

There are existing qualitative and quantitative data on which we are going to analyze by comparing it with NABH then interpret that is following the NABH standards were give an improvement in patient satisfaction or not.

We evaluated and compared various studies based on NABH standards and then analyzed the data.

1. Analysis of "qualitative" information (Study 1)

The data will be observed as follow in table 1, by the health workers in a given time.

This procedure in hospital undergoes a stepwise process in comparison with NABH Standards (AAC. 13), (ACC.14) are depicted below –

Table 1: Comparison based on NABH guidelines

NABH guideline	Protocol in hospital	NABH guideline	Protocol in hospital
NABH AAC 13		**NABH AAC 14**	
1. The patient's discharge process is planned in consultation with the patient and/or family.	Complete followed.	1. A discharge summary is provided to the patients at the time of discharge.	Completely followed.
2. Documented procedures exist for the coordination of various departments and agencies involved in the discharge process	Partial followed, they are not documented properly.	2. Discharge summary contains the patient's name, unique identification number, date of admission and date of discharge	Completely followed.
3. Documented policies and procedures are in place for patients leaving against medical advice and patients being discharged on request.	No documented policy and no separate format for it. Following partially	3. Discharge summary contains the reasons for admission, significant findings and diagnosis and the patient's condition at the time of discharge.	Partial followed, for patient condition there is no specific time.

4. A discharge summary is given to all the patients leaving the organisation (including patients leaving against medical advice and on request).	Complete followed.	4. Discharge summary contains information regarding investigation results, any procedure performed, medication administered and other treatment given.	Completely followed.
5. The organisation defines the time taken for discharge and monitors the same.	No define time for procedure.	5. Discharge summary contains follow-up advice, medication and other instructions in an understandable manner	Not followed.
		6. Discharge summary incorporates instructions about when and how to obtain urgent care	Not followed.

Various comparative observational study was also taken by Shobitha Sunil; the study was coming with a result that 50.9% of patient's discharge procedure takes more than the standardized time of NABH. On more by Seema Ajabi, that shows the average time for patients in completion of their process of discharging is 4.93 hours that is 295.8 minutes much larger than NABH standards. Another study taken by Alladi that shows Self-payment patient take 412 minutes, insured patient takes 386 minutes of Hyderabad hospital. Among them there is complete data collected by the study done by Alladi as follow-

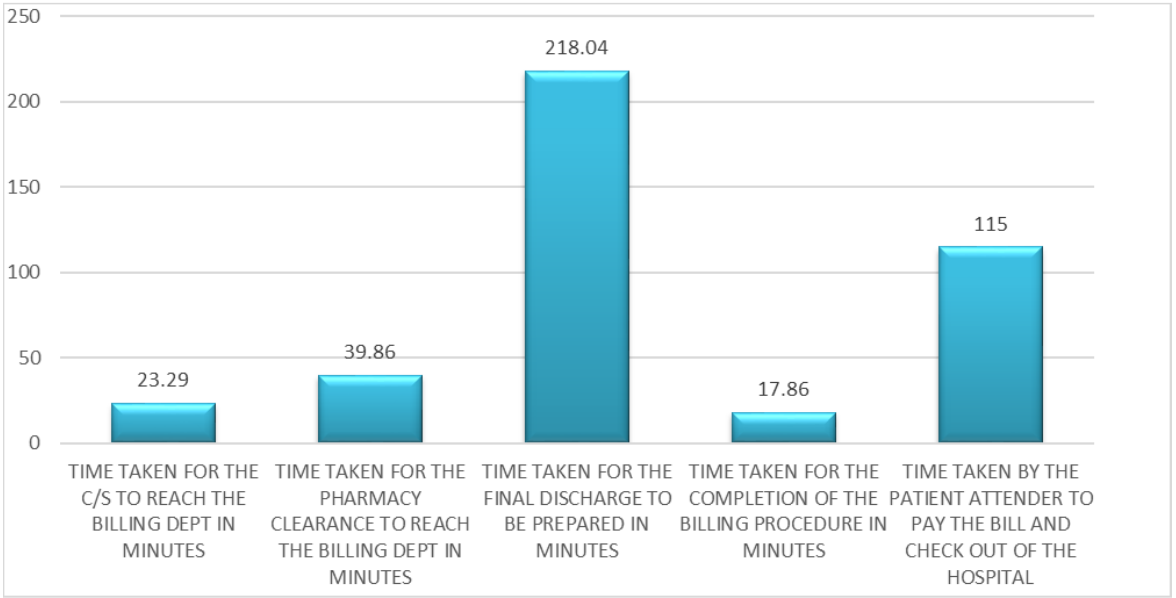

Figure 2: Time taken for various department for the patient with self-payment

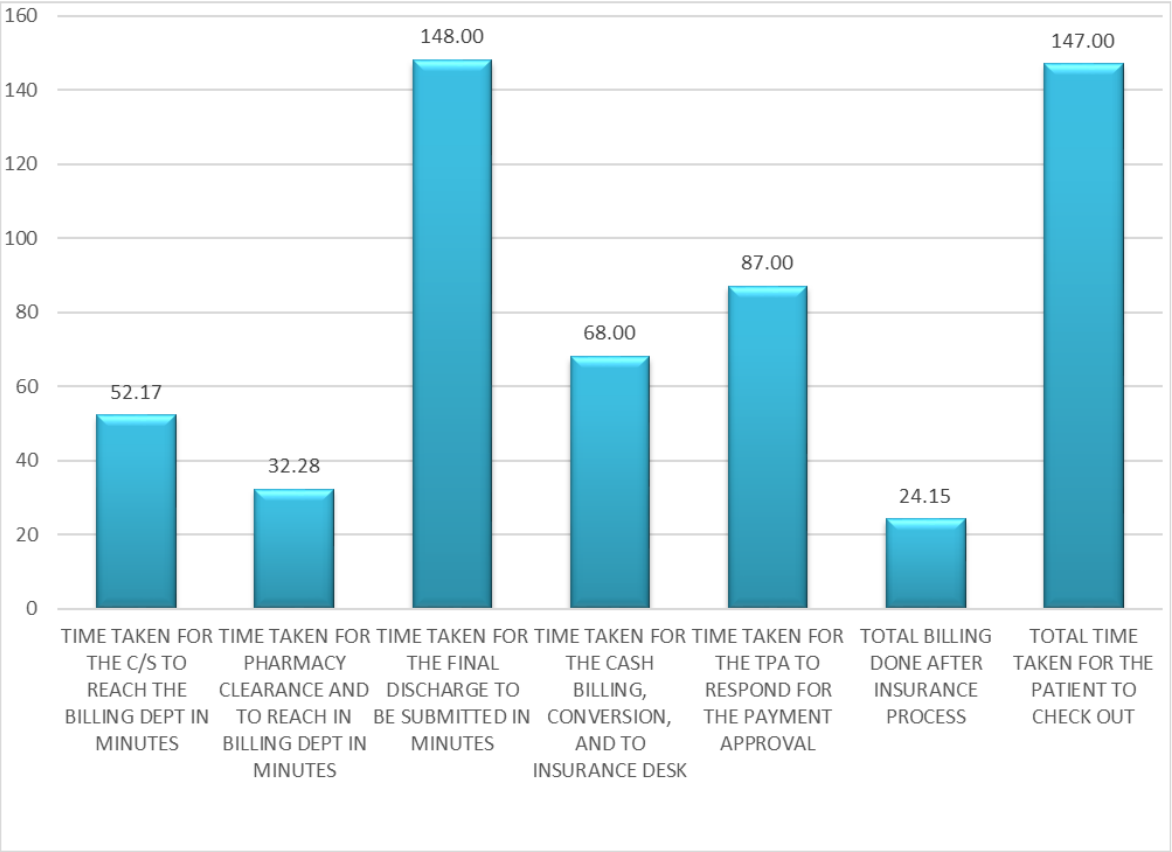

Figure 3: Time taken by the insured patient in the process of discharge process

Overall interpretation :-

The data collected; Time taken for the discharge procedure will take more time when not done with proper organized guidelines of NABH. So, it is important to do the procedure under guidelines to improve patient satisfaction.

2. Analysis of "quantitative" information (Study 2)

This study shows the time taken in the specific steps of the discharge process that are given by NABH standards and compares it with standards to analyze is there is a delay in the discharge process and if yes then why and is it cause the increased patient dissatisfaction.

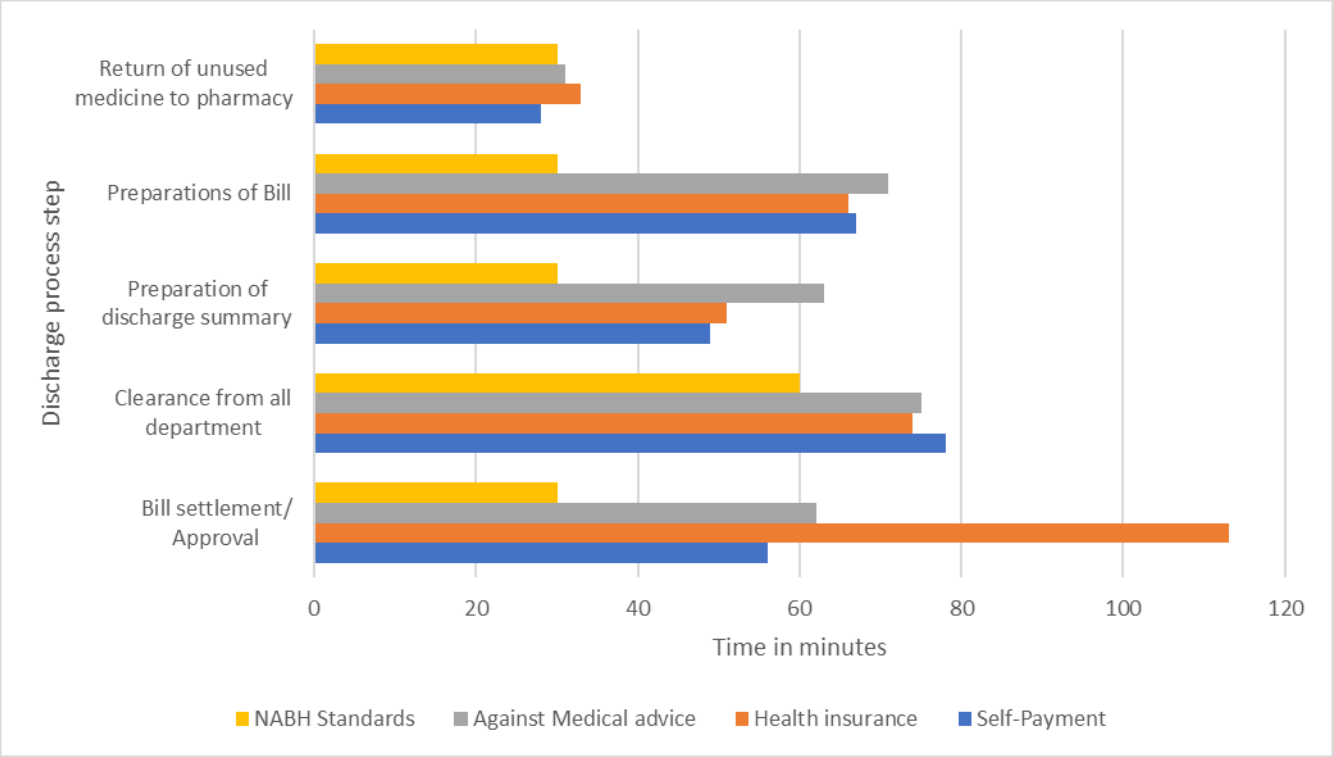

Figure 4: Showing time taken with 3 types of patients in the discharge process.

Most of the patients felt that the discharge process should be simplified (63% with average) patients' responses. Average of 61% of patients said that the process should be speeded up so that they can face less harassment and can back to their routine life early.

Overall interpretation :-

This graph of data clearly depicts that the average time for each step of all types of patients is much larger than the NABH standards. AS we know the NABH standards has the time of about 180 minutes. And here an individual patient takes 278 minutes, insured patients take 337 minutes, DAMA takes 302 minutes of Pune hospital. Also, one more observation was that the time taken for insured patients is the highest one.

3. Analysis of "quantitative" information (Study 3)

In this, we have to analyse the data of time taken with the patient type of self-payment in the discharge process.

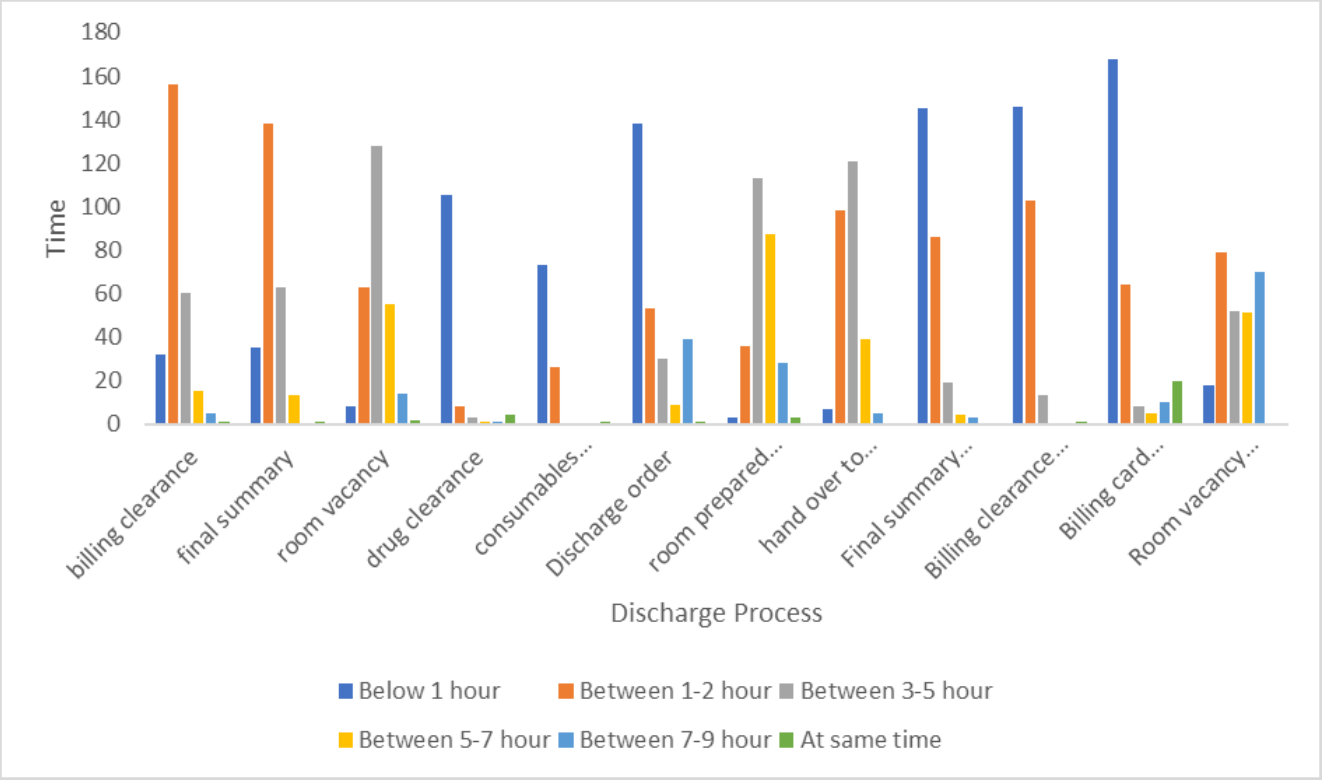

Figure 5: showing the time taken in the discharge process

By observing the above data, we calculate the Average Turnaround time.

Turnaround time = Competition time – Arrival time

Here, the completion time is the time taken from start to end of the process. And the time at which the process started is an arrival time. After calculating the TAT for each we will take an average of it that is Average Turnaround time, as shown in table 3.

Table 2: Average Turnaround time

TAT (T1-T12)	**Discharge Process Parameter**	**Average time**
T1	Discharge intimation to billing clearance	02:30 h
T2	Discharge intimation to final summary	02:29 h
T3	Discharge intimation to room vacancy	04:05 h
T4	Discharge intimation to drug clearance	00:37 m
T5	Discharge intimation to consumables clearance	00:44 m
T6	Discharge order to discharge intimation	00:28 m
T7	Discharge intimation to the room prepared for next	05:07 h

T8	Discharge intimation to hand over to patient	09:07 h
T9	Final summary signed to hand over to patient	01:17 h
T10	Billing clearance to hand over to patient	01:06 h
T11	Billing card updated on floor to receive at IP billing	00:18 m
T12	Room vacancy to the room prepared for the next patient	01:02 h

Overall Intervention :-

The data shows that there is increased average TAT in discharge intimation to hand over to the patient and in discharge intimation to room vacancy, and after calculation, we find the complete process takes about 3.50 hours. So, if they are followed by NABH guidelines there is proper documentation, and thus reduction in TAT and improve patient satisfaction will be seen. In which the major step overall takes 389 minutes of hospital in Ludhiana

8. DATA ANALYSIS

The next step what we do is to compare the all above-mentioned study that will help us to understand better results and help to identify factor causing an overall effect.

We have taken a 5 major step of discharge procedure for comparison these are-

- Preparation of discharge summary.
- Return of unused medicine to Pharmacy.
- Clearance from all the departments.
- Preparation of Bill.
- Settlement/Approval of Bill.

Study 1 is Hospital (H1) with 2 patient type(PT) - PT1 (Self-payment patient).

PT2 (Insured patient)

Study 2 is Hospital (H2) with 3 Patient type (PT) - PT1 (Self-payment patient)

PT2 (Insured patient)

PT3 (Against medical device)

Study 3 is Hospital(H3) with 1 patient type(PT)- PT1 (Self Payment patient)

Based on these available data we see the time taken in the type of patient in various hospitals in the process of discharge process and compare it with NABH Standards. As shown in fig. 5

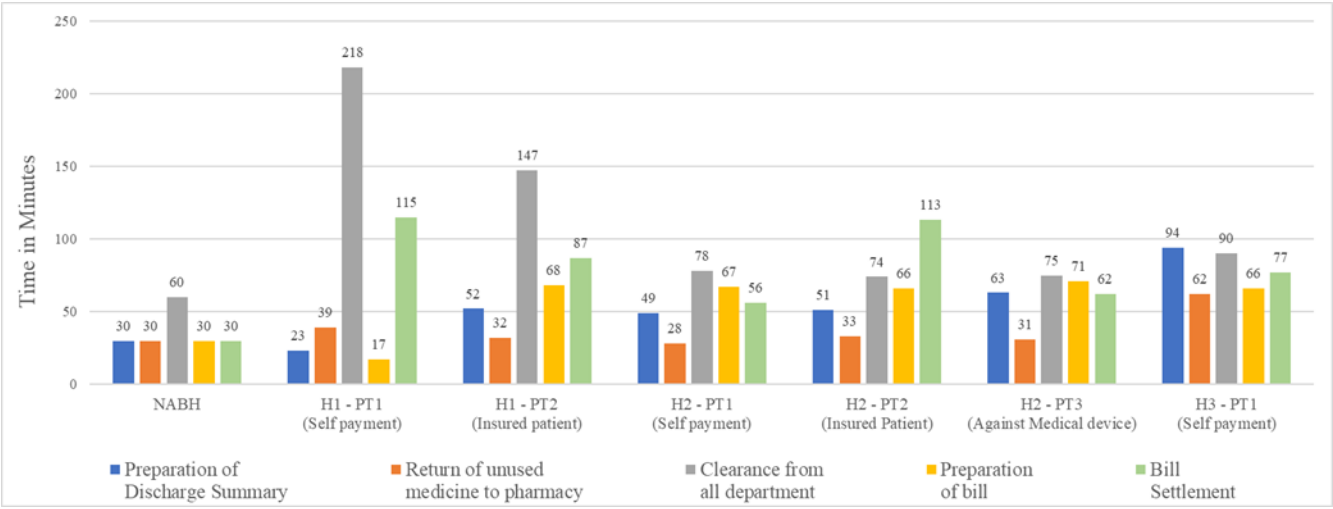

Figure 6: showing a comparison of all three studies with NABH Standard.

After analyzing these studies, we evaluate the data by this diagram.

To show the cause of a delay in the Discharge process and to identify the factor causing an overall effect we have come with this tool to describe cause and effect as shown in Fig. 7

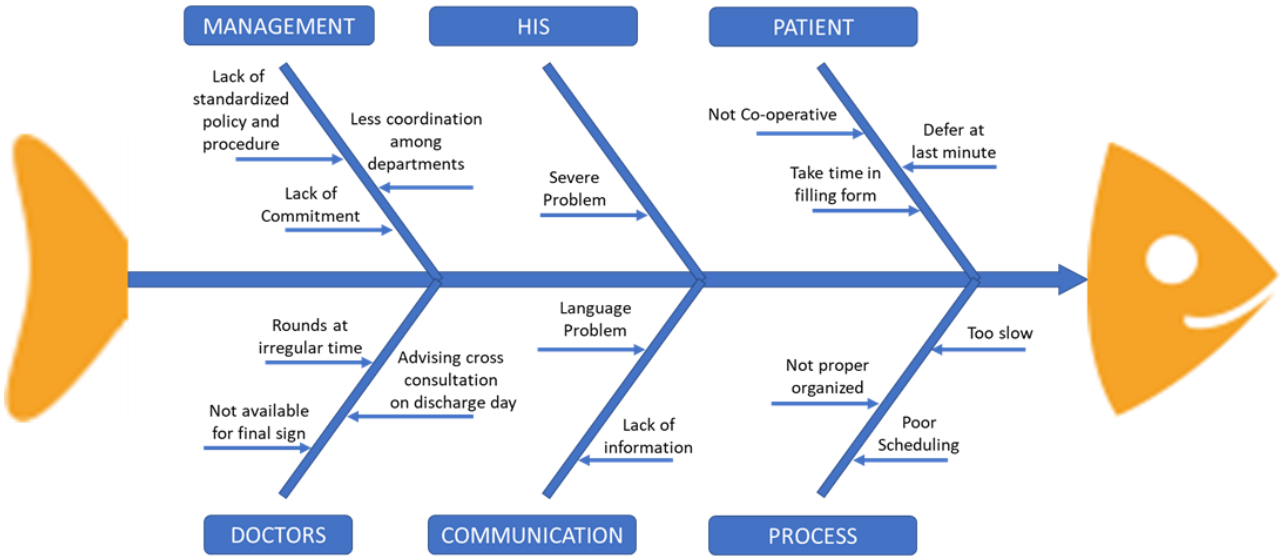

Figure 7: Ishikawa diagram

9. RESULT AND DISCUSSION

The studies intelligible give indication delay in all steps of the procedure of discharging especially in the Billing process, room preparation with a type of insured patient when compared to NABH standards. This is important to note for healthcare since a well monotonous

with proper time in the process of discharging have a great role in reducing patient dissatisfaction and improve the hospital's future business. Delay in the process of discharging has also a direct effect on increasing the risk of hospital-acquired infection for patients. So, it is important to take a step forward for solving all these types of issues. As we know, the National Accreditation Board for Hospitals and Health Care Industry and Quality council of India has set a standard of 180 minutes for the completion of the process of discharging. Only by following NABH standards, we can achieve the goal of the hospital that is always a Patient satisfaction.

10. CONCLUSION

The discharge process is a complex process and the main process. It is "the process of activities that involves the patient and the team of individuals from various disciplines working together to facilitate the transfer of patient from one environment to another". The patient and their relatives are impatiently waiting for the time to go to home or discharge from the hospital to start their normal life without any due delay in this. Therefore, we should take this step as soon as possible and increase the number of hospitals to be standardized by NABH to improve patient satisfaction and make our health care better.

The process of discharging has administrative type, clinical type, economical, legal parameters that are started from the procedure and goes up to the end of it. Yes, accepted many of the processes are time-consuming like bill process, room vacancy or preparation, pharmacy department but if they all done with a well-organized way and under-trained medical staff than it can be completed easily under the standardized time of NABH and give a better result.

As the studies are clearly indicating the delay in the discharge process, we should go through the issue and came up with a solution and must follow the NABH standards for improving our patient satisfaction as early as possible.

11. SUGGESTIONS AND RECOMMENDATION

There are few measures that can be taken by various hospitals to improve the discharge procedure flow and thus improving patient satisfaction-

- All departments of the hospital should make a well-organized plan for the distribution of the staff-patient ratio.
- All the members must be aware of NABH standards.
- There should be enough strict environment for following the NABH standards.
- All the healthcare should make an organized way plan for the training of all the health workers.
- Should take patient feedback, their family member feedback and then go through the issue.
- An administrator of the hospital themselves undergone with the time-motion study to understand, implement the procedure for further improvement.
- Late rounds by the doctors is a concern too, so in that case a reminder should be sent to the doctors about the rounds with full detail to speed up the work.
- Vigorously IT system should work to manage the system functioning smoothly.
- There should be individual billing counter on every floor.
- For a day after holiday pre-preparation should be done to avoid the crowd.
- There should be an electronic health record to avoid duplication of data to save time.
- The discharge summary should be written prior to one day of discharge.

12. QUESTIONAIRE INTERVIEW

Various interview has been taken in the above study to know the cause of delay in discharge procedure among them some questionnaire format is as follow-

1. Factors affecting Health workers (Nurses, employee work under doctors)

How did each of the factor influence in your relationship with delay in the process. Please circle any one number below for each parameter.

2. Patient feedback

- Did your treatment meet your expectation? If No, why?
- Are you satisfying with the service of healthcare workers? If No, why?
- According to you what is the main cause of delay in the process?
- Any suggestions to improve this?

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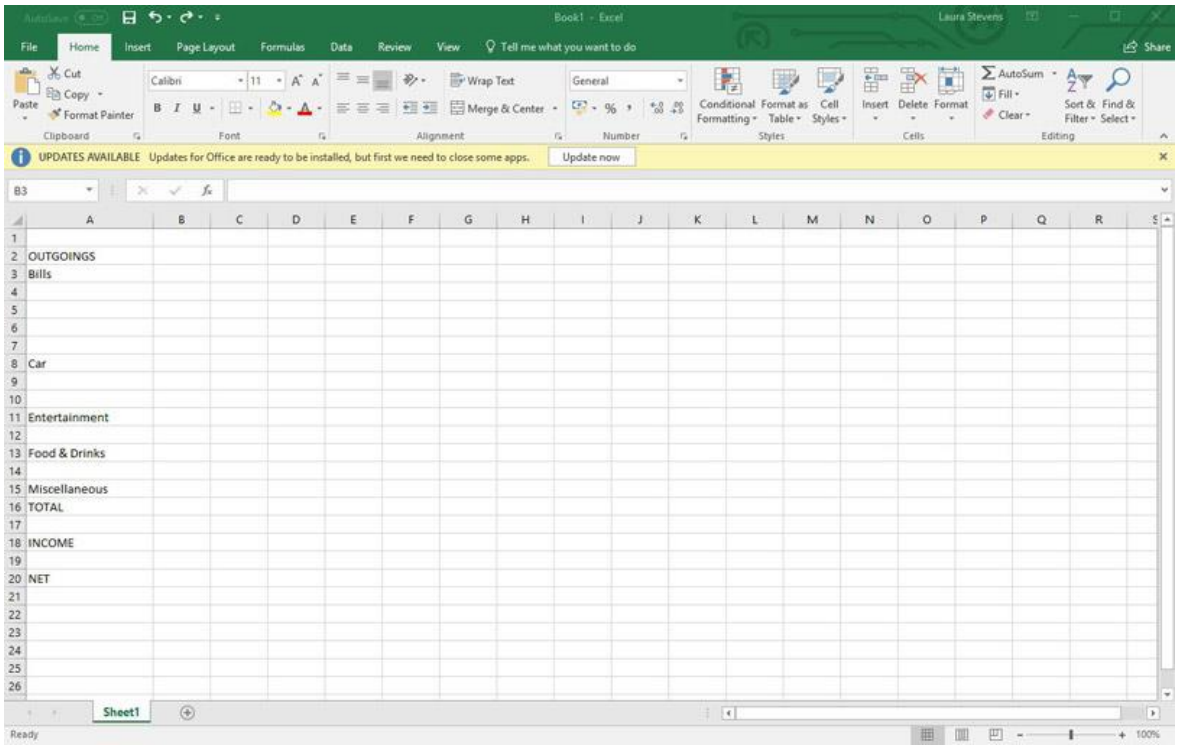
PART – 2.1.

ONLINE COURSES
Microsoft Excel - Excel from Beginner to Advanced

1. COURSE DESCRIPTION



In this course three main task should be completed to complete this course. This includes-

1. Ask question

In the chat box of course selected in Udemy, we should ask question related to Excel. If u know the answer of others query than u can answer for this than Kelly who is the Lecturer of this course will sort out the problems.

2. Course Exercise file

Various exercise file is there available in the course that we have to complete after competition of topic related with that file. There are such 11-exercise file that we have to complete. One of them are shown in figure.

3. Excel Fundamental quiz

There is various quiz after every section that should be passed by scoring above 60%. It depends in some section there is only one quiz test in another may be 2 or more and in some there is no such quiz test.

What all this course will include are depicted as below

Basic fundamental of Excel

This include how to launch Excel, Start-up screen, Excel interface, Quick access to excel, their structure, Common excel shortcut keys etc.

Entering and editing text and formulas

To create spreadsheet, working with numeric data, entering data values, working with cell references, to create basic formulas, type of cell, understand the order of operation.

Working with basic cell function

To learn the structure of an Excel function, work with SUM, MIN, AVERAGE, COUNT.

Adjacent cells error, Auto sum, autofill command.

Modification of Excel worksheet

This include the method of moving and copying data, deleting and inserting rows or column, changing width or height of cell, Hiding and un-hiding of rows and column, renaming of sheet etc.

Formating data in an Excel Worksheet

This include how to work with font, method of changing background, formatting data and percentages etc.

Inserting images and shapes into Excel

This include inserting images, formatting and working with Excel smart art.

To create basic charts

Includes how to create excel chart, how to modify it, how to work on it etc.

Printing and Woking excel sheet

It includes changing margin, scaling etc., working with page layout some introduction about Header and Footer.

Working with Excel tempate

It includes intro to template, Opening and creating template.

How to deal with Excel list

This include how to handle with big data, how to filter, sort, format data list etc., introduction to Excel function.

Excel data Validation

Dynamics formulas, Custom excel data validation, Excel decimal data validation etc.

Pivot tables

How to create, modifying, formatting, drilling, filtering pivot tables data. How to activate into Excel sheet, PowerPivot KPIs, PowerPivot Calculated fields.

Working with large sets of Excel data

This includes using of Freeze panes tools, grouping data, print option for large data set, how to consolidate data.

Working with Excel conditional functions

What is Excel name ranges, how to edit, how to use various Excel () functions, VLOOKUP (), INDEX (), MATCH () functions etc.

Auditing and protecting of Excel sheet.

Tracing Precedents, Dependents, Watch window, protection of Excel sheet.

2. OBJECTIVE

3. METHODOLOGY

- Duration of Course

  Course is of 16.5 Hours duration.

- Source of Course

  Video from Udemy.

- Task

  It contains various exercise file to do and quiz that should be passed to move for further section.

- Content

  This course helps to learn Excel from beginner to advance

4. COURSE CONTENT

4.1. What is Excel.

A software programme that was created by Microsoft contain spreadsheet also known as worksheet in which we can analysis. number and any data by using various formulas and functions.

It is a spreadsheet program, which contains several columns and rows, where each intersection of rows and columns is a **CELL.** Each cell contains one point of data or information.

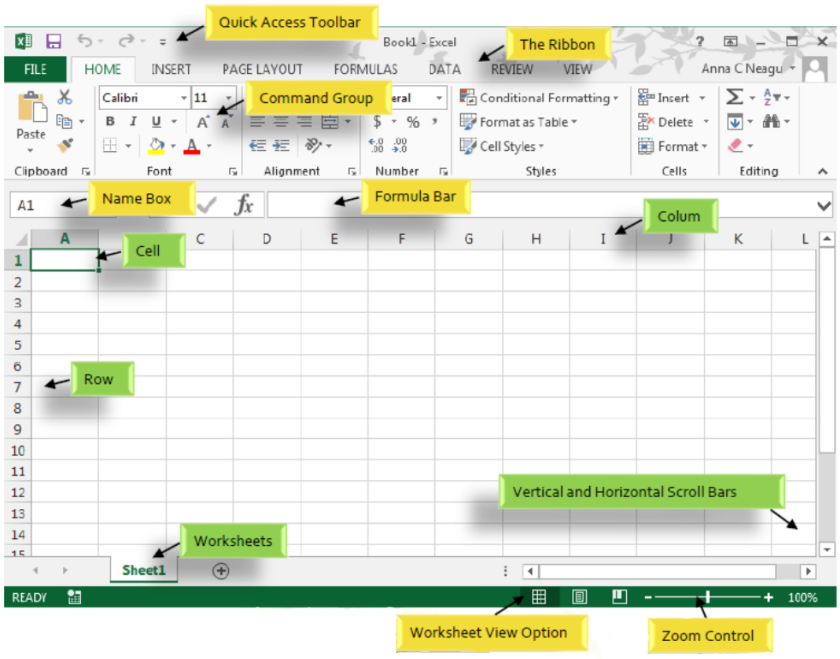
It was first released for Macintosh systems in the year 1985, followed by the first windows version in 1987. Various Excel releases for windows are-

Satya Nadella, Microsoft's CEO, maintains that Excel is still the one Microsoft product that stands above the rest and 750 million knowledge workers worldwide support that claim every day.

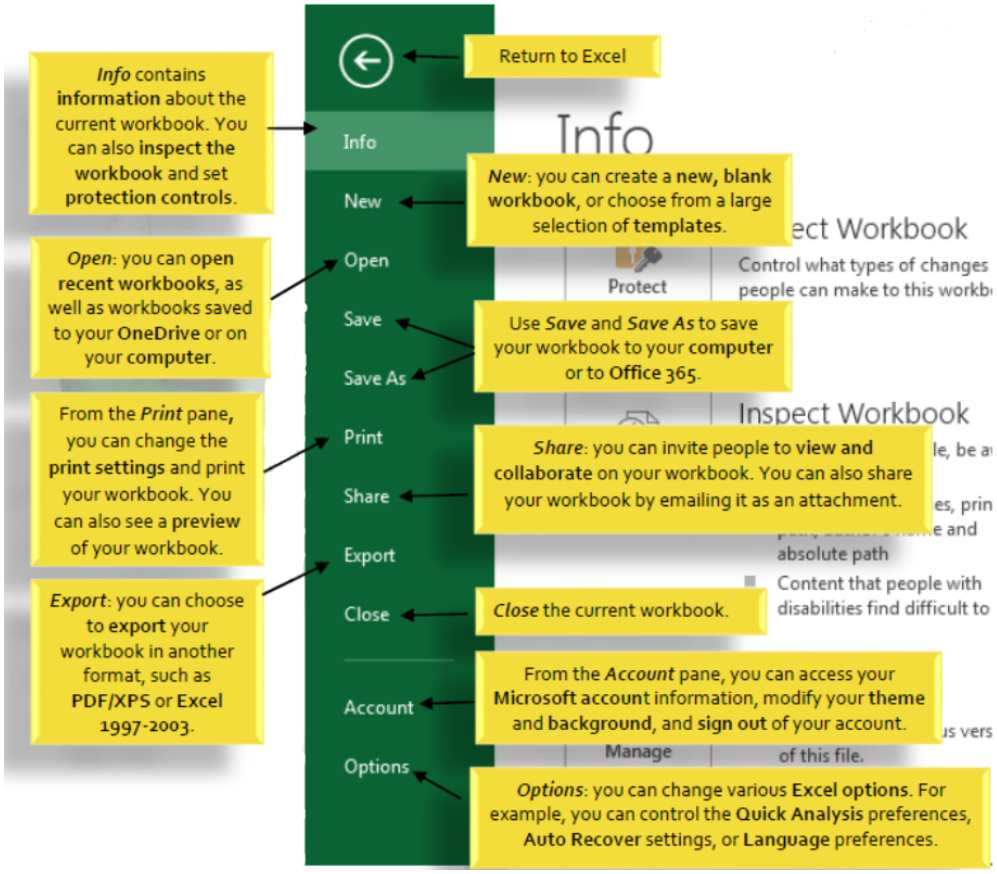
File extension of the Excel previous to 2007 is **xls**

After 20007 the extension of Excel is **.xlsx**

Basic parts of Excel shown in figure



File tab on the ribbon will appear as



4.2. The Workbook Window

After opening an Excel, a new workbook is open with an single worksheet later on we can add. There can be maximum of 1 lakh rows and approx. 16 thousand of column in a worksheet of excel.

- **Worksheet**

  Excel file also named as workbook. Each workbook is open with single worksheet. Theses worksheet also called as spreadsheet.

  This is an important point to note that when we open an Excel file it will always open with 1 spread sheet. A worksheet or so-called spreadsheet contain grid of column and rows. In which rows are designed by the numbers and columns are designed by the letters. The column is run across that worksheet and rows run across top to down.

  When worksheet is open if we want, we can easily open the multiple worksheets. This will help to easily manipulate and examine the data in number of worksheets. *Workbook contain maximum number of worksheets at a time is 255.*

- **The Scrolling Buttons**

  The scroll buttons help in viewing all the data from top to bottom. It will help in examine the data by scrolling from top border of worksheet to lower one. This will be done this one at a time.

- **The Scroll Bars**

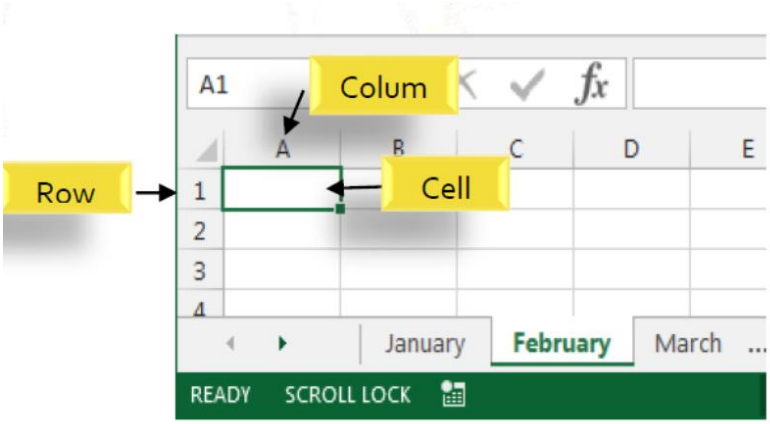
  In case of lot of data in the worksheet by scrolling button, we can see the data one at a time. But by click on the scroll bars from horizontal to vertical or vice versa , or up to down we can see the page on which we want by holding and drag this bar.

4.3. Cell Basics

While we are doing work on the worksheet, the information we enter are always in the cell. Cell is the basic of Excel without this we cannot enter our information So to run excel correctly basic of cell should be understand.

- **Understanding Cells**

  Worksheets have various rectangles of same size and proportion that can be change further are known as cell they are thousands in number. Cells are the intersection of rows and column in which Rows are recognize by numerical digit like 1;2;3... and Column are recognize by letter like A;B;C... Information whatever we enter are stored in the cell.



- **Formatting Cells**

  A cell containing information are by default formatting. Formatting is basic need for cell to easily evaluate, analyse, examine the information enter into the data. Formatting will help in ease of reading book or file. It gives the feel to read. It will draw an attention to the information. Formatting will be of variety numerical, content of letter , shapes, size of text etc.

- Formatting of Font
- Alignment of text
- How to fill the cells and colour it.
- Cell styles
- Text and numbers formatting

- **Columns, rows and cells modifications**

  Cell in Excel are of same or definite size and proportion this is automatically made by excel itself. But for more content or for attracting modification of cell formatting is needed. For these two main modifications is there in Excel for change the cell size proportion wrapping text and margining cells.

  Wrapping text and merging cells

  Cell with lot of information need formatting of cell. In this case wrapping text should be do not that will automatically according to information resize the cell. This will prevent the change size of rows and column. Wrapping text will automatically resize the column and rows as well. Merging cell is another modification that will help to increase the cell size for large information.

4.4. Formulas and Functions

Most useful, necessary, and powerful tool in Excel is using formulas and functions. Excel has tools for calculations.

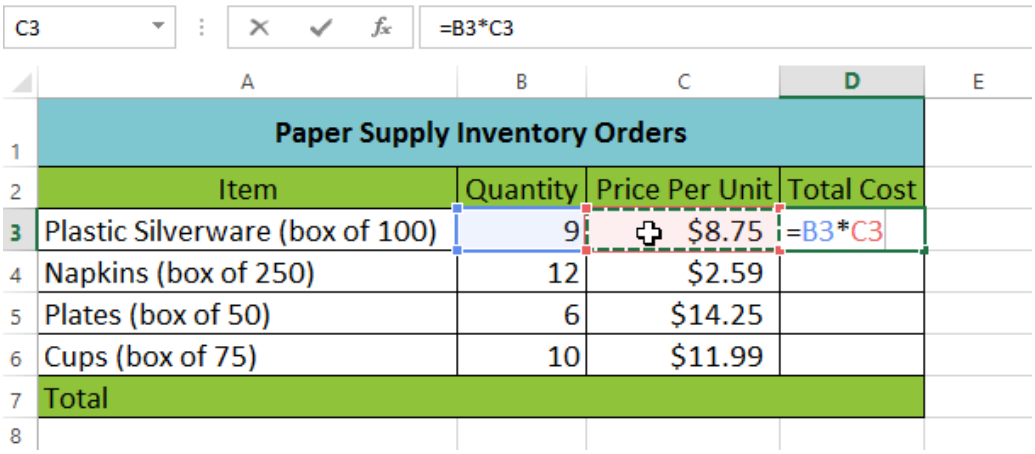
- Simple Formulas

  Basic need for calculation is that the calculations should be started with sign of "equal (=)"

Addition	+
Subtraction	-
Multiplication	*
Division	/
Exponents	^

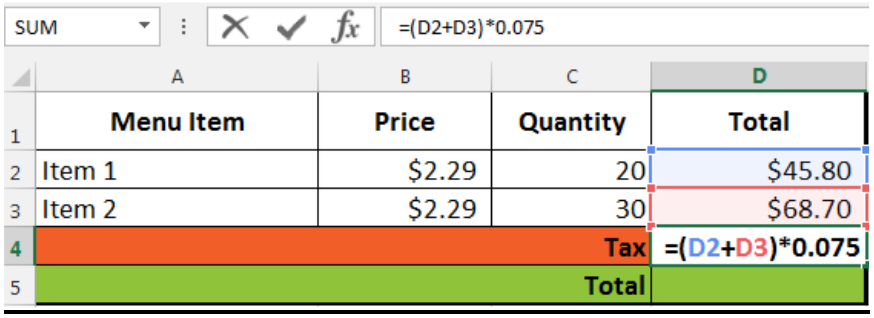
=A1+A2	Adds cells A1 and A2
=C4-3	Subtracts 3 from cell C4
=E7/J4	Divides cell E7 by J4
=N10*1.05	Multiplies cell N10 by 1.05
=R5^2	Finds the square of cell R5

Cell which selected as shown in blue and red line using Multiply sign of formula with kept equal sign at starting are addressed in the formula and the blue and red selected cell are addressed at referenced cell. After entering in the keyboard, the calculated value will be appeared in the cell. A shown in fig which is the exercise I have done during course.



- Complex Formulas

  To calculated data with complex formula order of operation plays important role. As we know the simple calculations are like 4+5=9 and 3+3=6. But now if we want to calculate that 6 & 9. In that case we need to calculate it by using complex formula. In simple word when there is a greater number of operation complex formula should be use by arranging the odder of operation. As shown in fig.



4.5. Cells References

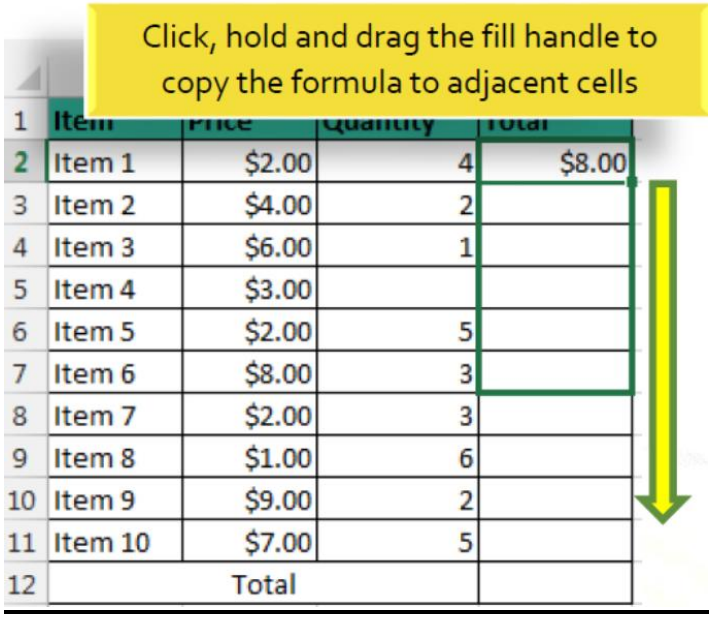
Cell references are of 2 types relative and absolutes cell references. Relative reference will save time by copied the relative formula and thus while drag fill the cell with that respective formula in each reference cell. While absolute cell reference when drag copied the same pattern. It works with remain constant throughout the row or column.

Absolute cell reference

Absolute cell reference always used with a sign of dollar ($).

A2	The column and the row do not change when copied
A$2	The row does not change when copied
$A2	The column does not change when copied

Relative reference



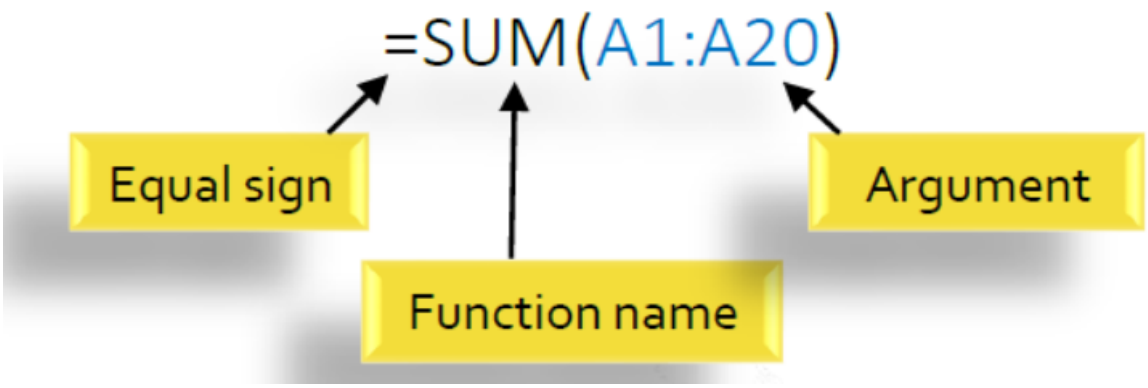
1	Item	Price	Quantity	Total
2	Item 1	$2.00	4	$8.00
3	Item 2	$4.00	2	
4	Item 3	$6.00	1	
5	Item 4	$3.00		
6	Item 5	$2.00	5	
7	Item 6	$8.00	3	
8	Item 7	$2.00	3	
9	Item 8	$1.00	6	
10	Item 9	$9.00	2	
11	Item 10	$7.00	5	
12		Total		

4.6. Functions

Predefined formulas that will help in calculating numerical data is known as functions. There are various formula functions like sum, average, count, maximum, minimum. To use this properly in excel we should understand the various function since for calculation they are basic need.

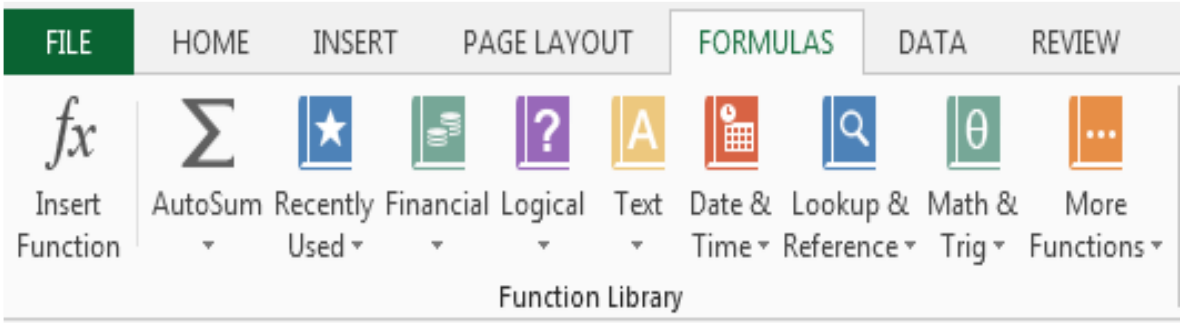
$$Formula = B1 + B2 + B3 + B4 + B5 + B6 + B7 + B8$$
$$Function\ using\ formula\ = SUM(B1{:}B8)$$

Function should be written with the use of equal sign (=) so that it will properly work, and this is called as syntax. Syntax term is only used for equal sign (=) that was the basis need for calculation in Excel. Then a function name example SUM or other argument should be written.



4.7. Library of Functions

Numbers of functions that are large in number, once we can use most frequently used function will help in analysis data or information. This is not compulsory to read each and every function or it is not like that if u don't know every function you cannot run excel but yes some variety of functions will help us in new type of project. Functions are search by various category, like Financial, Logical, Text, Date & Time, and more from the Function Library. Which is present on the Formulas tab of Ribbon bar.

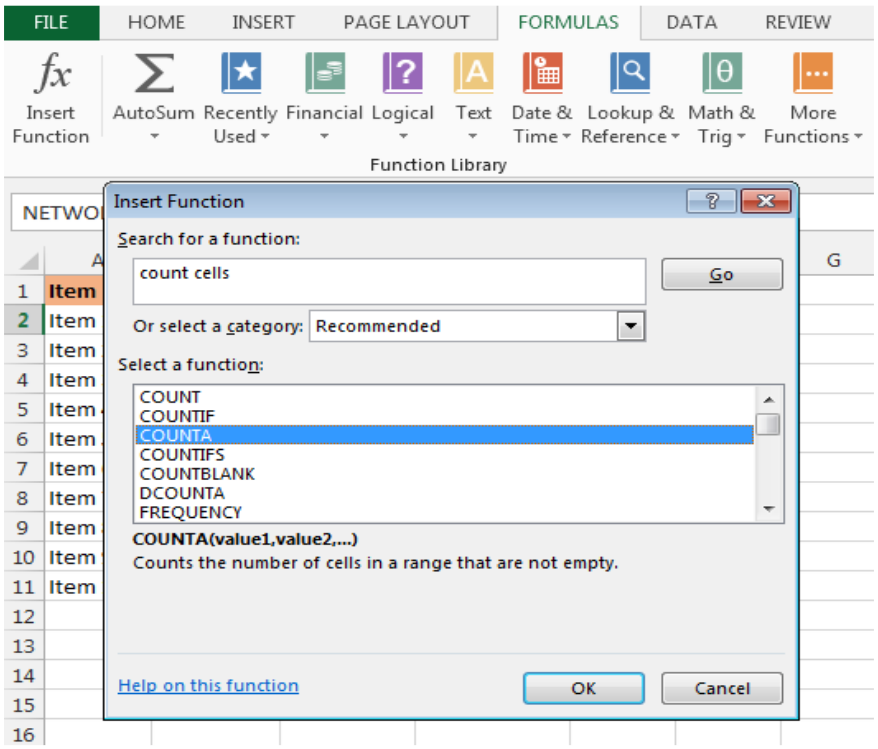


- Insert function in the Formulas of ribbon will help to identify all the different function is easily done if you find trouble in searching right function.
- For common functions like SUM, COUNT, AVERAGE Auto sum function command is the basic function and also easy for calculations.
- Recently use command is the function that when selected will help to work for the command using in recent work. This will prevent repeatedly selection of same command during work and thus save time.
- For calculating payment method PMT or any data related to loan RATE Financial function will be used.
- Logical category functions use to identify the arguments for a given value. For example, if an order is Rs. 40 and Rs 39 for delivery, but if it is above Rs. 90, do not charge for delivery(IF).

- There is another function that is text function this help in texting in argument for task purpose for example convert the case letter lower or upper and by replace the text.
- Date & Time category function will help in working with date and time entry or modifications and will maintain the current date and time NOW or the SECONDS.
- Another function Lookup and references will help in identifying the specific information which we want. By adding Hyperlink or Index by intersection of rows and column.
- Maths and trigonometry function command help in calculating the **mathematical sums, subtotal, product. PI** etc.
- Other Functions contains additional functions includes engineering, statistical etc.

The Insert Function command

1. First select the cell that should be taken for the calculation or function.
2. On the Ribbon tab click in formula than on insert commands.
3. And after this one box has appear called as Insert box dialog box.
4. Mentioned the function what we want to calculate.
5. Then click OK.
6. Again, a box appears known as function argument box.
7. Click OK.
8. Result will be appearing.



4.8. Important Excel formula

1. SUM

   Formula used for SUM function: =SUM (6,6), =SUM (A1:A6).

   This function will give the result of what exactly we want. And can be used for the data with as large in number.

2. COUNT

   Formula used for COUNT function: = COUNT (A1:A99)

   The count formula will give exact count of the data of which we want.

3. COUNTA

   Formula used for COUNTA function: =COUNTA (A1:A50)

   The difference between COUNT and COUNTA is that in COUNTA this will count all the cell with no empty does not matter which character is the cell is. It counts the data with all type or character.

4. LEN

   Formula used for the function LEN is: =LEN (A1:A6)

   This function will help in identifying the characters other than numbers example !,@,#,space etc.

   Example 10 cells are with space and 12 cells are without space.

5. VLOOKUP

   This is the function help in identify any entry which we must find a crowd of data in table or row and range. Therefore, it is called as lookup and reference functions. For example, we have to look up on customer last name by their phone number or we have to look up the customer phone number by last name.

   Main secret of point to be noted for lookup is that we have to organize our data in the form that the data what we find should be left to the return value.

Syntax: VLOOKUP (lookup_value, table_array, col_index_num, [range_lookup])

- Lookup_value: This is required, should be done during VLOOKUP. Whatever value we want to lookup must be in the first column of table_array. For example, if the value is in A1:F5 than lookup value should be in the A column.
- Table_array: It is the range of cell in which VLOOKUP are search for lookup_value and return value.
- Col_index_num: It consist the column number from left most corner from where the return value is present.
- Range_lookup: It will help in identify the exact or approximates matches.

VLOOKUP will always first search vertically than after identifying desired item it moves to right.

For example, here we are use VLLOKUP for lookup_value of **Photo frame**.

	A	B	C	D	E	F
1	Item	Price				
2	Spice rack	$19.99				
3	Stationery	$5.49				
4	Gift basket	$25.99				
5	Cutting board	$24.99				
6	Landscape painting	$35.99				
7	Greeting card	$4.99				
8	T-shirt	$15.49				
9	Scarf	$29.99				
10	Coffee mug	$8.99				
11	Tea set	$16.99				
12	Serving bowl	$12.99				
13	Wrapping paper	$3.99				
14	Photo frame	$9.99				
15	Handmade soap	$4.49				
16	Gourmet hot cocoa	$5.99				

Start with equal than select VLOOKUP = **VLOOKUP (PhotoFrame**

Then we select the cell range that contain here we select whole row of A2:B16 = **VLOOKUP (PhotoFrame, A2:B16**

Then use col_index_num Number of ranges (columns) = **VLOOKUP (PhotoFrame, A2:B16,2**

Then we use range cell, that is approximate matches (TRUE), exact matches (FALSE). Mostly the approximate matches are used when the 1st column is of numerical value. Therefore, we are using fourth one as FALSE. **= VLOOKUP (PhotoFrame, A2:B16, 2, FALSE)**

And this will give us answer **9.99**

6. IF Statements

   Formula = IF, this is a logical statement either true or false.

   One example given below

   Let us say a salesperson has a quota to meet. You used VLOOKUP to put the revenue next to the name. Now you could use an IF statement that says: "IF the salesperson met their quota, say "Met quota", if not say "Did not meet quota" = IF(C3>D3, "Met Quota", "Did Not Meet Quota")

   This IF statement will tell us if the first salesperson met their quota or not. We would then copy and paste this formula along all the entries in the list. It would change for each salesperson.

4.9. Working with Data

- At the same time there is need of different data since the content of data are very large for this excel provide us a tool that is Freeze panes and viewpoint. This will do by splitting of worksheets many times.
- Another tool presents in the excel is Sorting. This tool helps in easy, fast identification our data by sorting. Sorting can be done on only one column or if we want we can do it by range of cell.
- Last but not the least is the filtering. This will help our data to narrow. Thus, easy for us to understand or read the large data by saving time. Also help in giving importance to the data that main focus during project or any kind of work.

4.10. Working with Charts

- Understanding charts

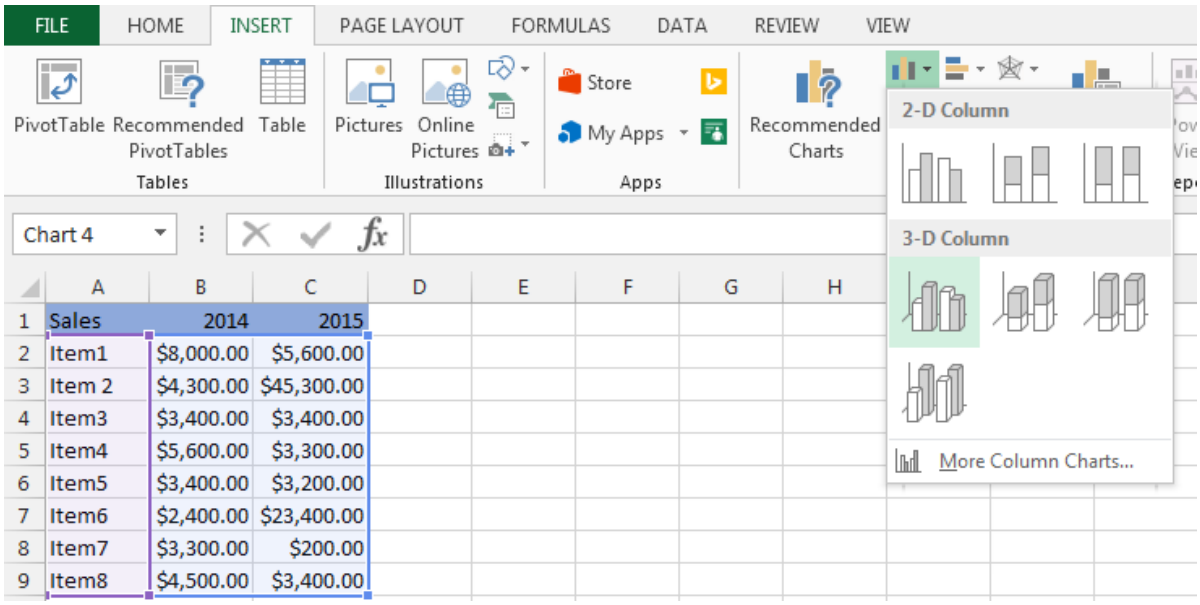
  Charts are the very useful part for analysing the data. It is very easy to made the main focus for perfect charts is that the table of data on which we have to make chart should be of proper headings, formatting. There are various charts graph tools in the excel like bar graph 2-D, 3-D graph, line graph, pie charts etc. This is also help in comparing the data.

For better understanding we have to know about all type of charts provided by the excel separately.

Various types of charts:

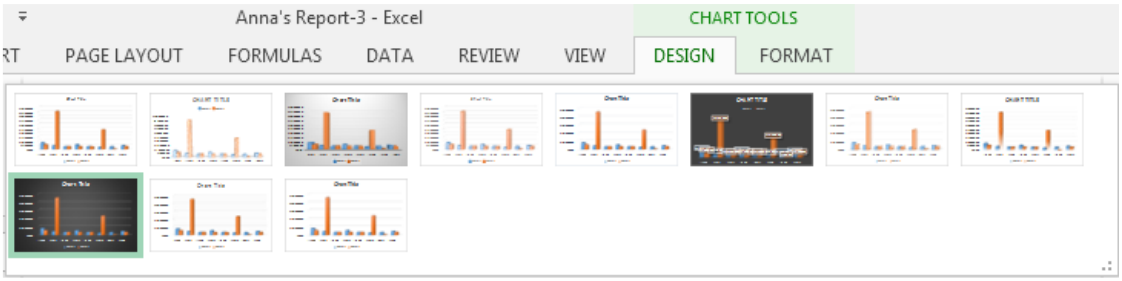
- Data that has represent in the form of verticals bars are the column charts. These types of charts are commonly used for comparing data with other one.
- The data which are represented in form of point in the line are the line charts. This chart helps to identify the exact changes occurred over a period.
- For comparing of value of proportion, pie charts are much useful. Data in this type of charts are represented in the form of percentage as a slice of pie.
- Bar charts in the form of vertical are known as bar charts.
- When the lines in the graph are filled with area are known as area charts, more or less same as line charts.
- The data which are represented as 3D are the surface charts, very useful for the large data.

Figures show how to insert chart using data

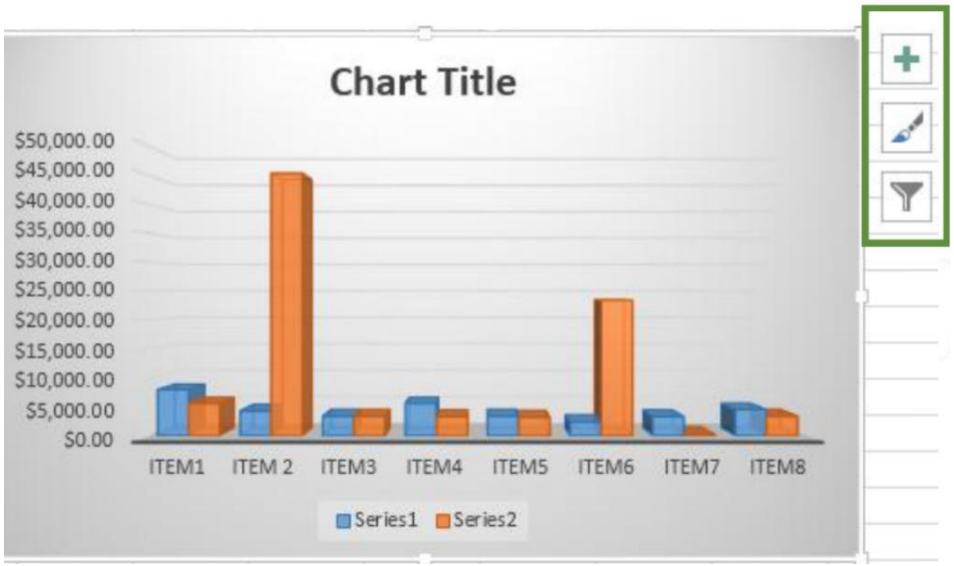


- Chart layout and style

When our chart has made from the given data, modification of chart is also mostly needed that we can do by using a design tool in Ribbon.

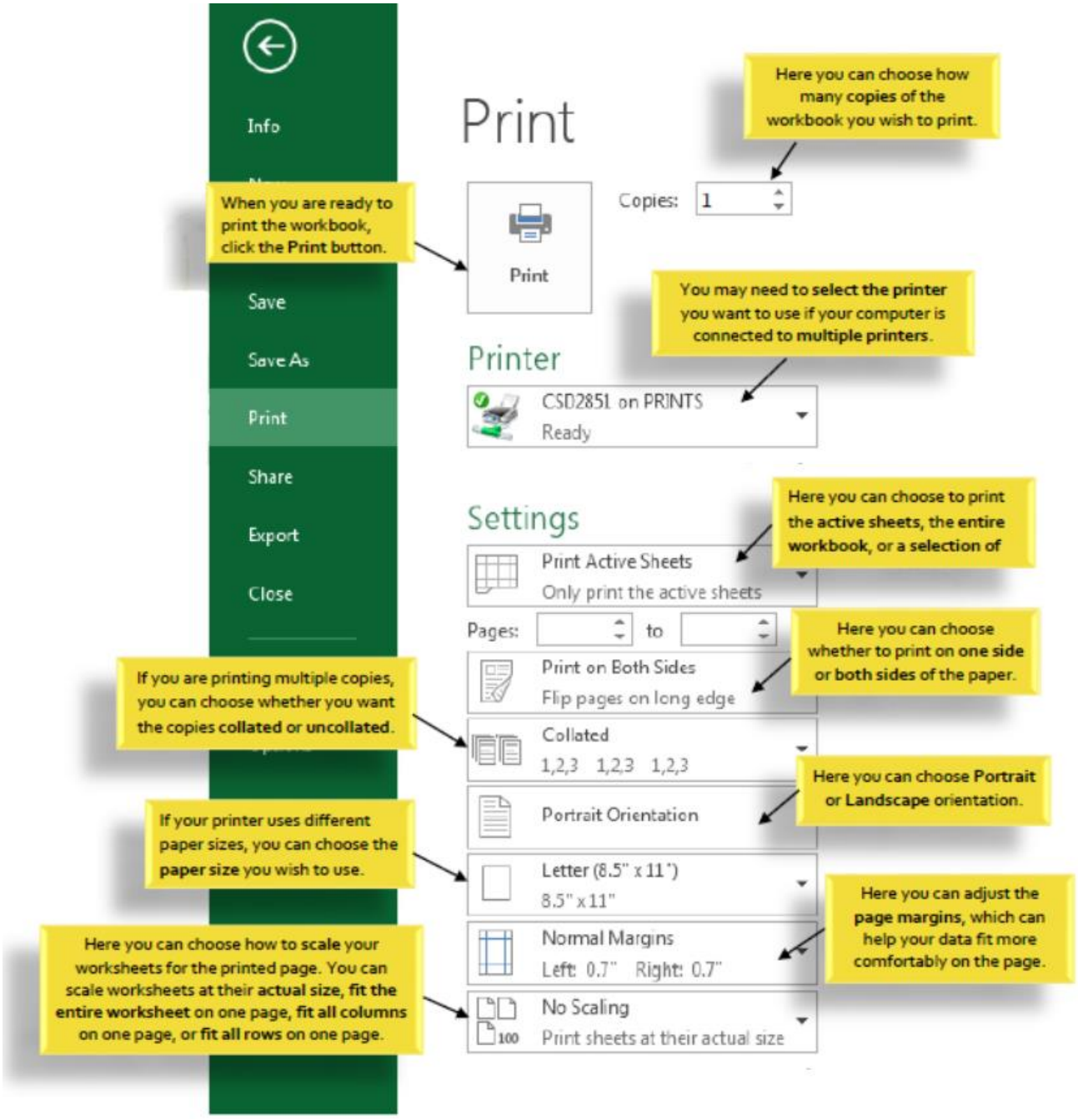


Note - We can use our Chart graph corner guideline for modifying chart axis , heading, structure. It will become a shortcut for us.



4.11. Printing Workbooks

Printing a workbook is the basic need in any offices work. There is time when after completing your data analysis or work into your workbook you need to print sometime or mostly for the submission Here are the steps for orienting Workbook shown in below figure.



4.12. Worksheet Organization

It contains workbook template, how to finalize the workbook and how it should be protected, Spell check, document inspector, workbook will also be locked for the safety purpose.

Excel 2013 a “big grid” increases the number of rows per worksheet from 65000 to 1 million. And column 200 to 16000.

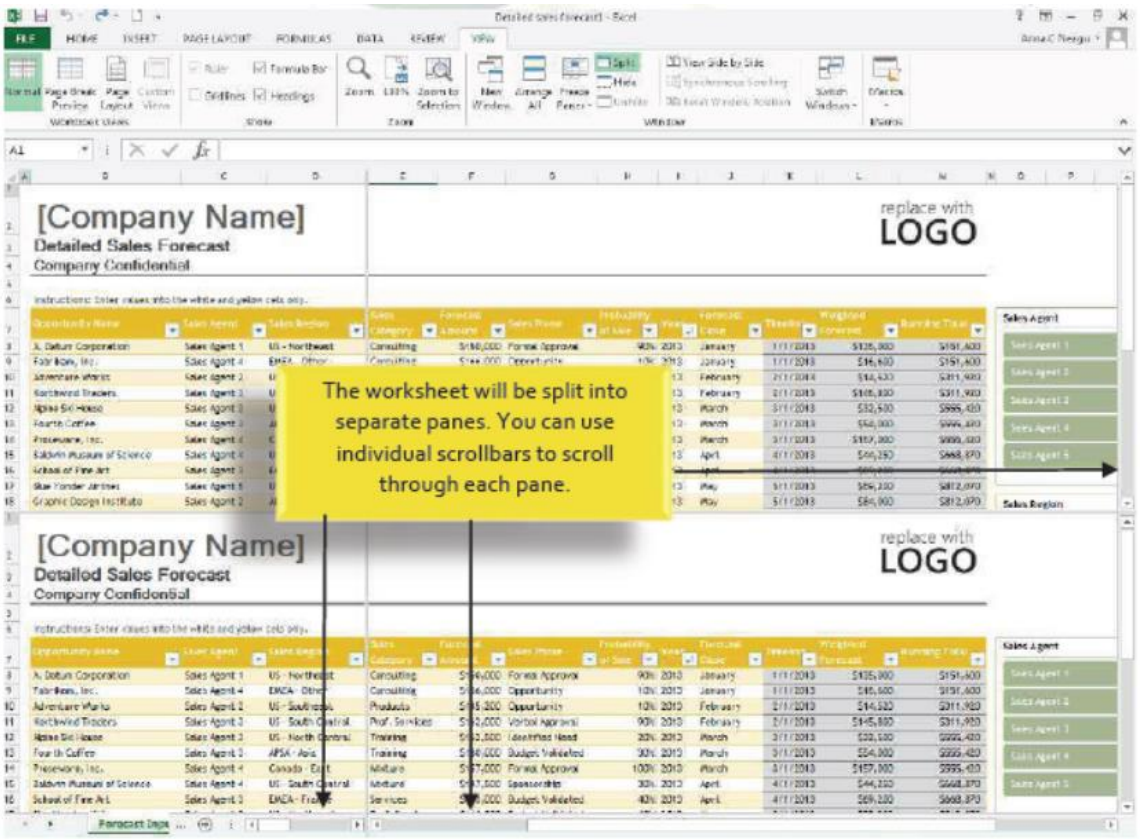
Important note- When we open workbook there is only 1 worksheet by default than we can add.

- Workbook Template

  Template is a type of worksheet that is predesigned, that help to work in Excel quickly. This will save our time since it includes custom formatting and formulas which are predefined.

- View Option

  When the data is very large, or your workbook contain a lot of content that time it is very difficult to handle it or to compare every sections. That time **open new window** or **split worksheet** is very useful.



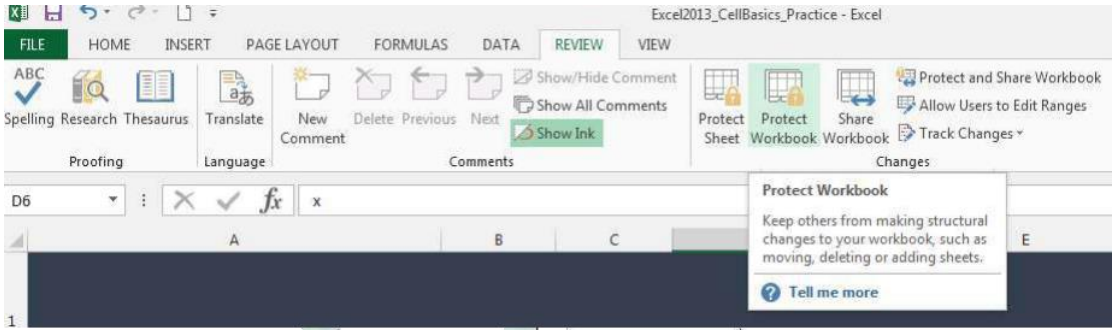
- Finalizing and protecting Workbook

This is important to note that before finalizing and protecting the workbook there should be no spell error, information error, for this Excel include spell check and document inspector tools.

- Password Protected workbook

Sometimes it is necessary to give a password to our file to protect it from any type of fraud. Since in Excel whosoever will open can easily change the data .

So, for password basic three steps should be following by click on the review tab and then on the protect workbook.



4.13. Data Analysis

Analysis of data using Excel is very easy and save time. But if the data contain lot of content than is will be little difficult to do each and a every part or section. For that one tool is present in the Ribbon of Excel that is Sort and Filter.

Filters are of two types

Auto and Advance.

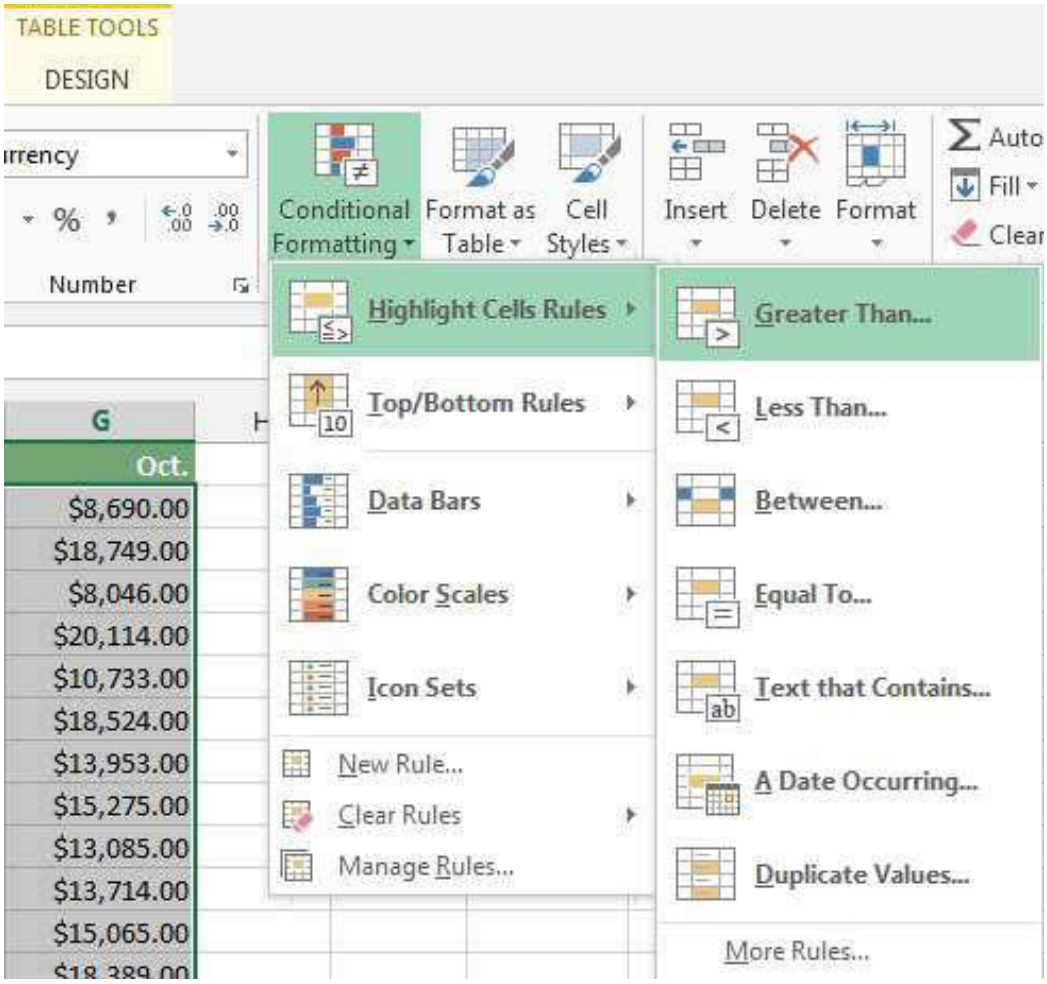
Auto Filter will put down the arrows with menus in the heading or titles of each column. Remember one thing that to filter correctly the worksheet should include header row which will help to identify the column.

Advance Filter will help in filtering the specific content something which is not basic. Excel contain various advance filter tools like text, date, search and number filtering which help in narrowing our data and help and save time for data analysis.

4.14. Conditional Formatting

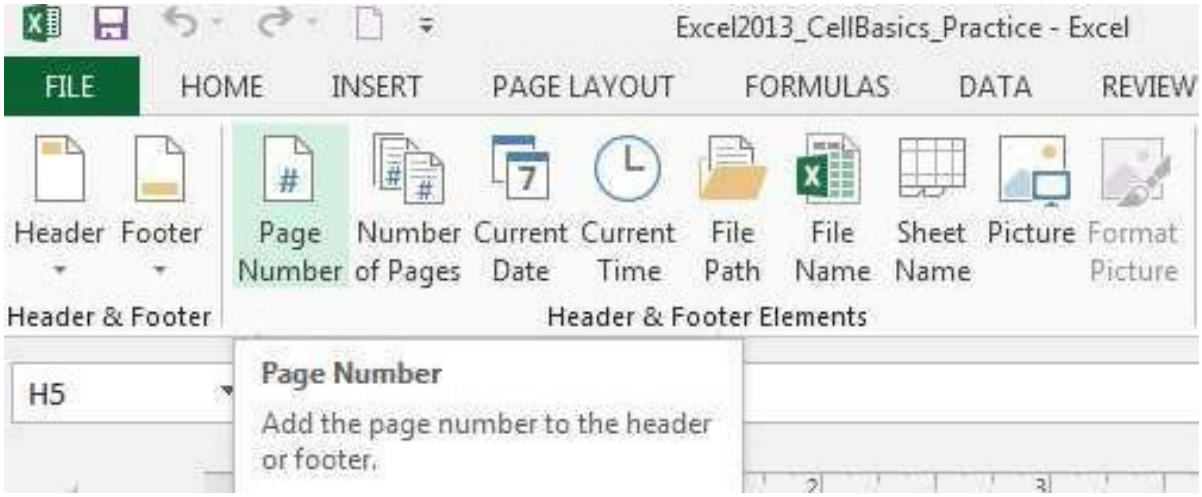
As we all know that when we have data of thousands that time to check each data is very difficult. To examine every row or specific row that ha specific importance we can use a tool available in Ribbon that is Conditional Formatting.

Using this formatting it is easy to highlight he data with various colour coding for easily identifiable. Conditional formatting allows to automatically application of formatting such as **colour, icons, data bars.**



4.15. Insert Headers and Footers

To make our workbook easier to read and more professional we can add Headers and Footers. Headers will appear in top margin and Footers will appear in bottom margin. They are appear in the ribbon bar and then automatically help to mentioned date, page number, workbook name.



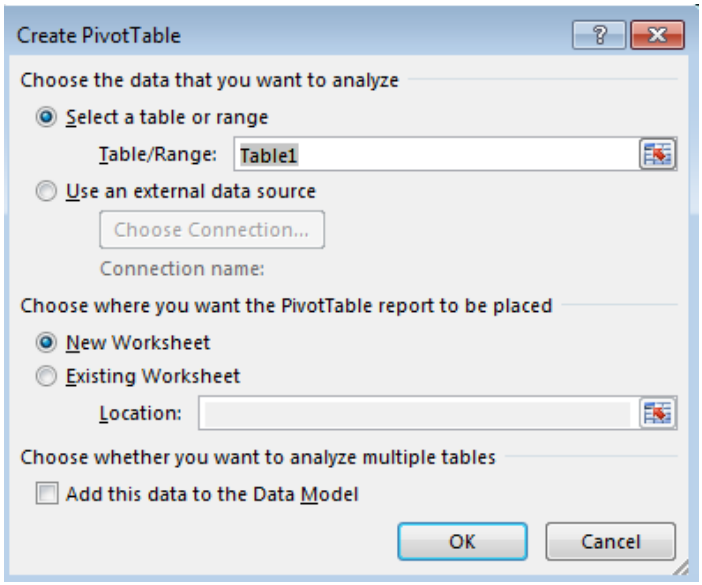
4.16. Pivot Tables

Pivot tables help to manage a data in a systematic way and help to easily manipulate it. Pivot table is help in quick calculation and summarize the data in a way that it is easy to read and manipulate. Pivot tables is look like

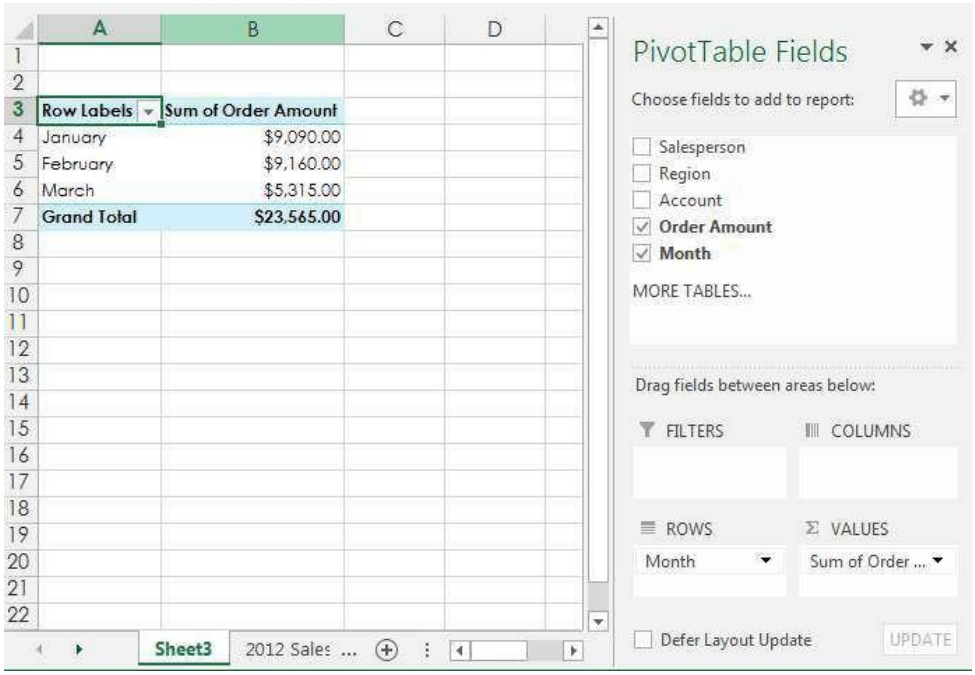
Row Labels	Sum of Order Amount
Albertson, Kathy	2650
Brennan, Michael	3700
Davis, William	1935
Dumlao, Richard	1490
Flores, Tia	4565
Post, Melissa	1690
Thompson, Shannon	3160
Walters, Chris	4375
Grand Total	**23565**

Excel will help in recommend and automatically create a pivot table.

1. Select the table or cell whichever is your data want to analyse.
2. From Insert tab, click in recommended pivot table



In this Selection of right table or range plays an important role. Once we create pivot table, we must choose the field the field should be column header of the source data.



As we can see in above figure the field of Order amount selected as Values and Month as a Rows.

4.17. Pivot Charts

For making Pivot charts pivot table is must. Then a simple method as in basic chart. Basic difference is the data table for Pivot chart should be Pivot table.

5. LEARNINGS FROM COURSE

- Help in saving time and productivity
- Knowledge about charts, tables
- Proficient in spreadsheet
- Ability to work with safety and security
- Handle a large data
- Gain knowledge about basic to advance excel
- Learn about conditional formatting, designing.
- Learn pivot tables and charts
- Data analysis by learn about functions and formulas.

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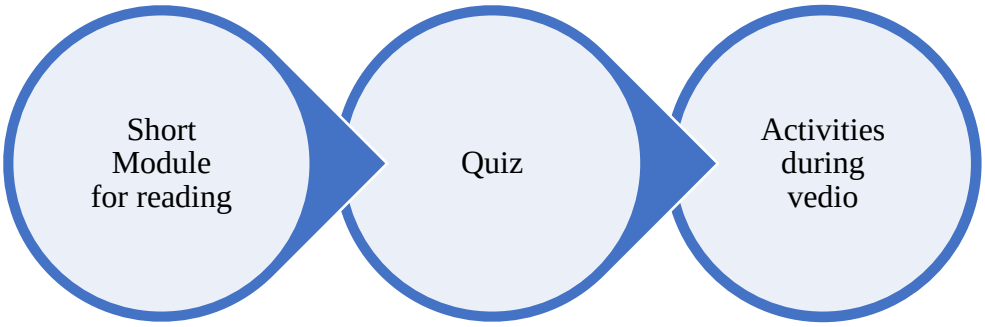
PART – 2.2.

ONLINE COURSES
eHealth - More than just an Electronic Record

1. COURSE DESCRIPTION

In this course three main task should be completed to complete this course. This includes



What all this course will include are depicted as below

What is eHealth, and what is mean for healthcare professional.

In this we learn about how the technology help in make a communication between healthcare profession and patient. Main focus of this to reduce the travel time mainly in rural areas. And also to prevent the delay in treatment. What are the question we ask to the healthcare profession

or what are their opinions for eHealth? What should they have thought since in Australia it was in process. So is it will help us, is it affecting in health system if yes they how if no why.

What does eHealth mean to you? And what does eHealth mean to all of us as healthcare consumers?

eHealth, in my opinion. How ability to use that data to build models of what my health should be in the future.

There are many formal definitions of e-health, and most are used interchangeably.

Description of definition. Rather than focusing on defining e-health, we've been developing a model to support how we conceptualize how e-health impacts on practice, teaching, and research.

What are the Experts saying?

Number of experts says about the impact of eHealth on their practice, the challenges in its implementation, and what developments they see lie ahead. Now let's look at their responses in brief.

Health in your hand, Health not healthcare?

Applications or apps, wearable devices, online health information and social media are all being used to motivate healthy behaviours and monitor existing conditions.

Collecting your own data.

How to use the data collection? What is the clinical use of collected data? Mobile app, health information online, social media uses.

Designing and evaluation eHealth solution

Co-design health app and Evaluation of health design.

Learning outcomes

Data and quantified self, data health records, anatomy of data health records, Case-study (Electronics record and supporting remote care)

Predictive and precise medicine, big data from our biology and environment.

Patient reported data

Privacy and security, Patient recorded data to be used.

Improving Access to healthcare

Innovations and supporting healthcare.

eHealth case study examples

My Physio app, how to use, electronic recording supporting care

2. OBJECTIVE

For Society, Policy maker	• To Increased quality of care • Provide Transparency of treatment
For Patient	• Simplification of treatment • Improve flexibility and access to medical knowledge
For Doctors	• Transparency of information • Save time

3. METHODOLOGY

- Duration of Course
  Course is of 16.5 Hours duration.

- Source of Course
  Video from Udemy.

- Task
  It contains various exercise file to do and quiz that should be passed to move for further section.

- Content
  This course helps to learn eHealth, use of eHealth. And also share the experience of using this app in Australia.

4. COURSE CONTENT

4.1. What is eHealth

Key concept used in this are

- Compare definitions of eHealth from both health consumers and professionals
- Recognize an eHealth model which illustrates how key eHealth domains intersect to impact on health care
- Develop an insight into the fundamental principles of eHealth
- Appraise your own awareness of eHealth in current practice
- Interpret the current and future challenges of eHealth for both health consumers and health practitioners.

eHealth has already many affects in the country where they are used usefully like Australia. When people listen about the technology first word come in their mind is eHealth is electronic health records and mainly used in acute sector. But it is not like that.

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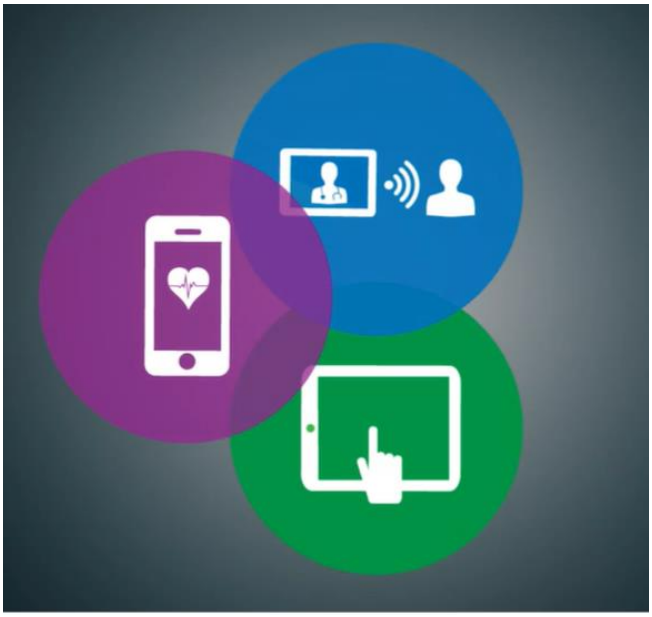
eHealth has apps, social media, website, wearable devices. This allow us to record even the single move of ours. They can download information, can interact with the friends, can connect with doctors, can share their problems, also only can take advice for precaution. **So it is not just a electronic record.**

4.2. Definitions of eHealth

They range from the very narrow, the focus on health informatics, through to wider definitions that are all encompassing. Rather than focusing on defining e-health.

We have identified three overlapping domains.

- eHealth is also health that is in hand of consumers. This includes wearable devices that contain app, social media, websites. Help in monitoring and recording health.
- Another is the communication of health professional with patients. This is mainly focus in the rural areas. It is just a normal video conference. Traditionally referred as Telehealth. It also includes maintains and training fitness of health.
- Lastly data record in the quantified self. This help in recording and storing of data. This is the ring that binds all. This nature of eHealth is overlapping domains. And a great impact when these three domain intersect.



4.3. Challenges faced for eHealth

challenges of implementing eHealth solutions. The devil is in the detail, to implement all the ideas, information, data. eHealth is a potent catalyst for change in healthcare delivery. We must be right up there with our education. So, the students we graduate need to be highly skilled in using it and being able to adapt to what we are expecting in the future. There are several challenges from the health care provider perspective. Some of them are around this is the way we do it, and we have always done it this way. So, it takes a mind shift to think differently about how we're delivering care. I think one of the biggest challenges is taking what our patients expect, seamless, connected, coordinated care, and really delivering that. And eHealth can make those transitions seamless.

One of the biggest concerns that society has nowadays I believe is how all this big data we are collecting about people's appearances about people's behaviours, about people's social

connections, will be used currently and in the long term future. This is such a difficult issue with so many possible answers. We have got to be targeted, and we have got to educate people about how they can use eHealth to maximize our investments. We could spend so much money on eHealth and it does not achieve what we want it to achieve. So, we have to think about the possibilities, we need to think about the challenges and then work through those through education and training, through having good plans, making sure we're investing in the right systems. The biggest challenge facing the ten-year plan of how eHealth can change the health service and consumer health.

industries would be that we are looking at accessibility and speeds. We need faster Internet; we need greater reach of the Internet through satellite and multimedia as well. Not just one service of text-based technology or one service of visual technologies, but many different technologies and applications.

4.4. Health in our hands

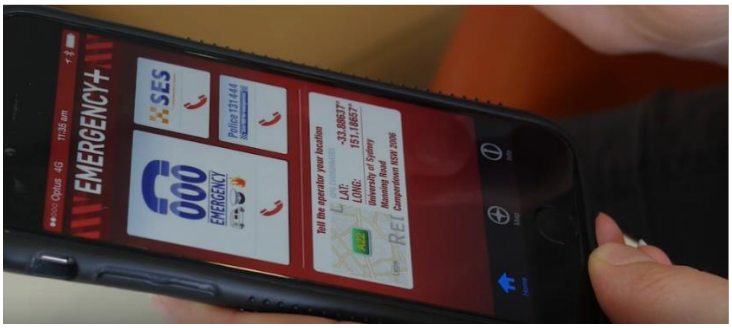
- Applications or apps,
- Wearable devices,
- Online health information and social media
  Are all being used to motivate healthy behaviours and monitor existing conditions.

This includes capturing and displaying personal health data, plotting data to monitor and track progress, delivering information in a variety of formats and providing opportunities for communication with health care professionals and patients and providing links to social networks. In this module, we will explore the evidence behind the impact of the use of apps, wearable devices, and social media on health. We will provide you with tips on how to evaluate apps and devices and how to incorporate them into healthcare practice.

4.5. Features of Wearables app

One of the bigger trends is wearable devices that interact with apps. Running app to track my kilometres and my speed, and it is a bit of a competition among my friends. Lots of patients now have wearable sensors in foreign country to, first get an objective base line of their activity levels. So how much walking are they doing, how much activity are they doing throughout the week? And then also measuring their sleep. Rather than just focusing on exercise a big part of fatigue management is sleep management, so we can get some basic data on their sleep patterns, their frequency of sleep, how many time they might be getting up throughout the night and so on. The real benefit is in the behaviour change perspective. So, we really find it hard to shift people's behaviours to exercising more to improving their sleep quality to some other health behaviour and this is just another tool. I's not the only tool, it is just one piece of the package that we can use with patients to improve delivery of healthcare.

4.6. Mobile app for health



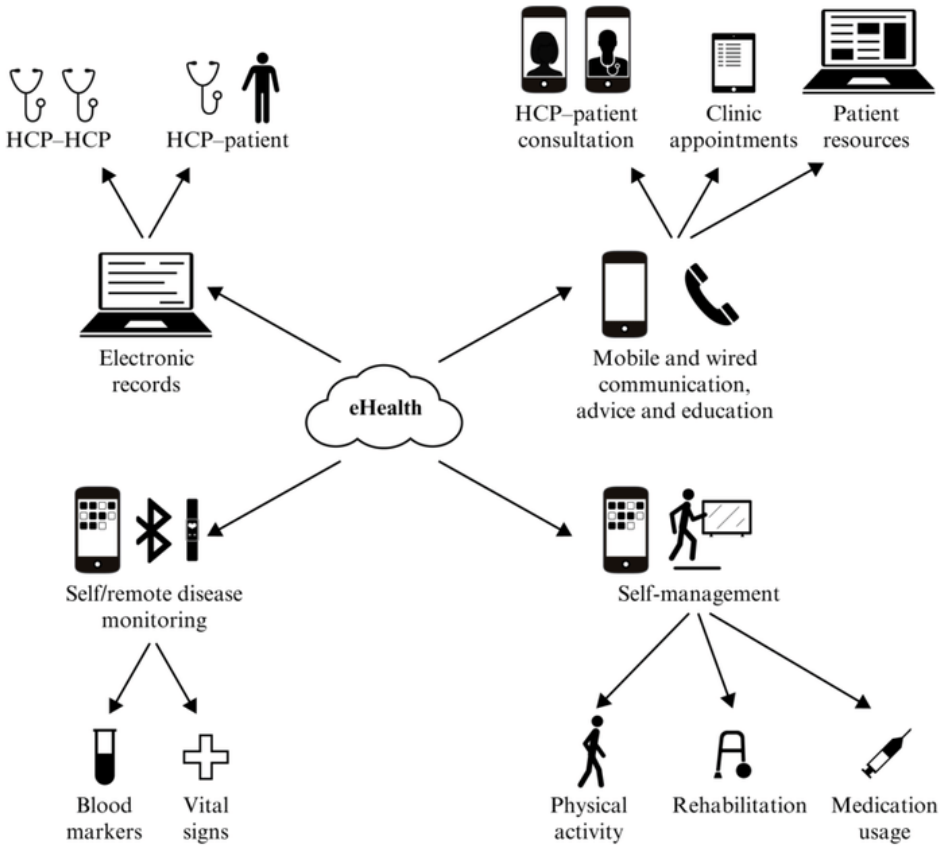
The use of apps, mobile devices, sensors, et cetera is commonly referred to as mHealth or Mobile Health and it represents a significant and ever-changing component of eHealth. We are increasingly seeing examples of mHealth in education and awareness using it as a helpline to provide assessment, and treatment support for remote monitoring, and data collection. It can also be used for disease and epidemic outbreak tracking. From the individual's point of view, Mobile Health is not only convenient. It puts health and healthcare into their own hands. It helps them to self-monitor and take control of their circumstances, which for people with chronic conditions, such as diabetes means that they can monitor their health in the comfort of their own home, which may reduce the need for unnecessary admissions to hospital.

4.7. Health Information online

This is fact that nowadays the people are much aware of social media and online information's. Most of the time patient first prefer the online precautions than go to doctors for consultant or they are communicating with health professions are already prepare themselves by little knowledge gained form online services. So this shows that consumers are increasingly turned to online information's. They prefer their own journey initially from prescriber, controller, coach, facilitator.

Well eHealth relies entirely on the effectiveness of the interface that each of the users sees. human computer interaction is about creating interfaces that people can actually use effectively and that they'll enjoy and that will perhaps even sometimes delight them, do things they had never expected, and certainly fit well into what they really want. And so often we need to create little prototypes, simple versions of an interface.

positive computing, the design and development of technologist to support psychological wellbeing and human flourishing. Positive computing builds around different factors as psychologists know support psychological wellbeing.



One of them is **autonomy, compassion, competence, connectedness.** The way we relate to each other. All of this are elements, these are constructs that psychologists know will support mental health and wellbeing.

4.8. Evaluating the health app

Evaluation is one of those processes that brings everyone together. And this is because researchers, clinicians, and patients all have a vested interest in and a responsibility to evaluate. So, if we take apps and mobile devices to common technologies, there are several ways that we can evaluate these tools.

- One level, we can look at the accuracy of the measurement**.**
- Another level, I can ask does measuring the number of steps I take motivate me to take more steps?

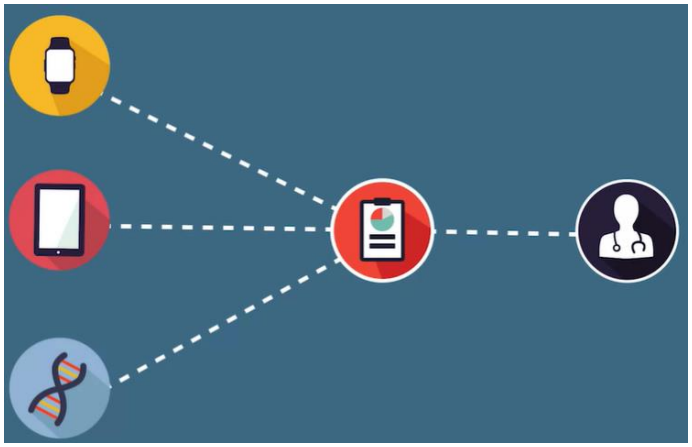
Criteria for using aaps or prefer which is best they are provide us with rating scale.

And they developed sub-scales, items, descriptive, and anchors and called it the **MARS**. Five broad categories and criteria were **identified, including four objective quality scales. Engagement, functionality, aesthetics, and information quality, and one subjective quality scale, which were refined and developed into a 23-item MARS tool.** Their results show that the MARS demonstrated excellent internal consistency, which is how well items on the test measured the same constructor or idea as well as excellent inter-rater reliability.

4.9. Learning Outcomes

4.9.1. Data and quantified cell

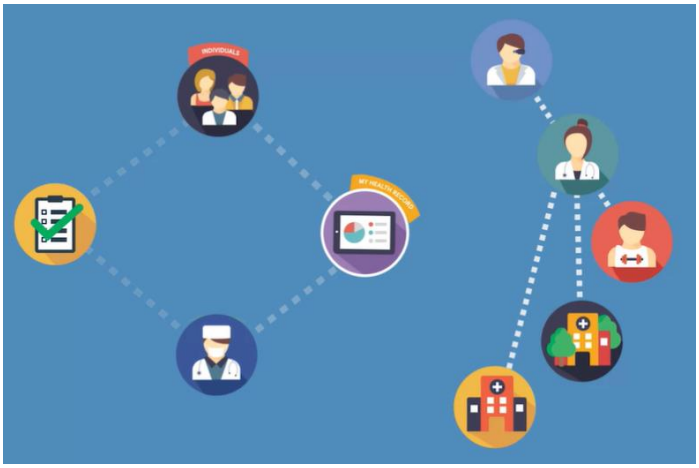
For healthcare data analysis, their evaluation, implementation is so massive. In the middle ages, the printing press transformed the way information was disseminated and consumed. And I wonder if the smartphone is playing a similar role into today's new healthcare reformation. Bigger challenge for health care system is to manage the large data that was deliver to consumer, patients. While much of our focus on data relates to the medical record, perhaps the most exciting and challenging aspect to managing health data relates to how we link the data from all the devices and apps we use with mainstream data stored and shared with our health professionals. In this brave new world, we need to address a whole range of issues.



4.9.2. Data and digital health records and their anatomy

Digitizing paper records is clearly beneficial. It enables a patient's medical history to be tracked over time. To alert patients for routine or follow up consultations, to monitor patients' vital signs. And overall, to improve the quality of care. In addition, aggregate medical records can be used to provide regular downstream information on individual team or organization performance.

And to link with quality improvement programs. Despite the obvious potential for medical records to improve care. The creation of digital information has presented massive challenges across all health jurisdictions.



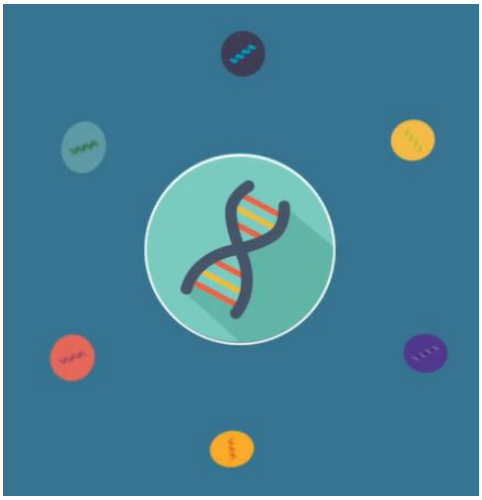
Despite the billions of dollars being invested globally into medical records, health is still perhaps decades behind financial travel services. In terms providing access to data and ensuring compatibility across systems. Consequently, many health systems still focus on basic services such as providing health professionals with accurate information. The ability to use digital information to transform care is yet to be achieved.

4.9.3. Predictive and precision medicine

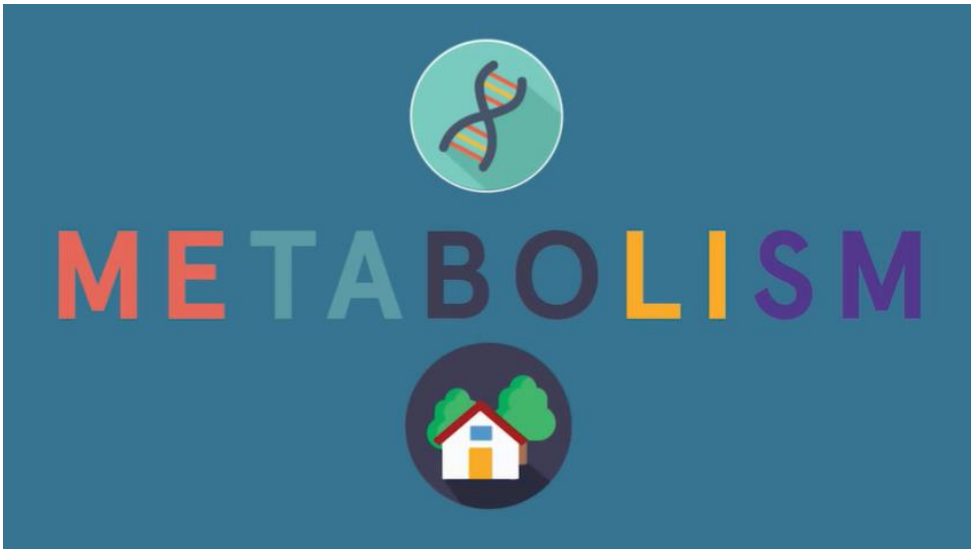
So, the fundamentals of health, lie at the interface between the biology of an individual and their environment, their lifestyle. I think we have treated rather too rudimentarily now. We tend to talk about lifestyle as in calories eaten and steps walked. And they're important aspects of our lifestyle but they really don't capture yet, the detail we need to really start to endeavour to predict better and in a more personalized way; or if not necessarily in an entirely personalized way, in a stratified way or a precise way, the way we deliver healthcare. So, so-called **precision medicine.**

4.9.4. Big data from our biology and environment

We have as individuals, I do not know, approximately 20,000 genes, so our genetic makeup is a key component of our biology. Those genes produce all manner of different products that can be in different states according to our development. So, our so-called **epigenome adding huge complexity.**



Our genes, through their products build our metabolism, and our metabolism is the fundamental interface between our genes and our environment. Metabolism is a vastly complicated network via chemical processes and those processes form very complex systems. If you tweak a pathway, you can have many and unanticipated outcomes, so that is our metabolism. That interfaces with our broader physiology, our behaviour, the way we think about the world, our cognitive function and ultimately, psychological, and behavioural outputs. So, all of that is just our humanity but we are not just a single entity, biologically. We are also host, in fact to 90% of the cells in our body which are not human. Most of those live in our gut, so there are at least a thousand species of bacteria that live in our gut. They interface with our diet and our metabolism in precise ways that can impact our health.



Our diet comprises dozens of separate nutrients which must be present in appropriate amounts and relationships, ratios in our diet, for us to function appropriately for our stage in life, for our genetic make-up and our environmental circumstances. And all of this ultimately impacts on the way that we build our environment and service our food needs, our exercise, and sleep is another component of our critical environmental biological interface. So, you can just get a flavour from that of the huge complexity in data. That we are dealing with to have a better understanding of our health. Calories in, Steps walked, eat less, move more, have not worked to stem the tide of obesity, diabetes, and cardiovascular disease. We need a better understanding of a complexity of that biology. But we cannot be over faced by it. We need to somehow simplify it into terms that are more tractable. So that is really the challenge of e-health at that level is, to help us manage the relationship between our biology and our environment.

4.9.5. Owing your own data

Patients are really the experts here; they are the people who know themselves best and they have a great opportunity to be able to contribute information and to really manage that information. The one common unit that travels throughout the health services is the patient and yet, our services now are a disjoint from the patient's perspective, the information sits in isolation in many different places. And yet, the one common thing is the way in which we should start to align the information, that is around the patient. the concept of **something called un-patient**, in which people own their health records and not the government or doctors.

One thing I have certainly noticed is that it reduces the number of blood tests I must do, because I actually already have the pathology results that particular doctor or that particular specialist wanted to look at. I also have some unique ones, for example, I have a slight cardiovascular situation and I have video recordings of my heart pumping after a treadmill test. And that is useful for being able to show, not just the specialists, but also my own doctor, so they know what is basically going on.

So, I find it simply improves the level of care that I am given. I will say, I have a unique solution, I bring my data along with me, and simply show people. I think there is another step in this which will allow me electronically to share that data with other people, including doctors and specialists, but potentially also, medical researchers should I wish to do so. But it is in my control and my ability to do that.

4.9.6. Using data to improve our performance

Surrounded by three domains of data.

- First, you have currently available data, which is largely restricted to pathological data, imaging, history, and some information on how patients are responding to treatment.
- You then have emerging data. It includes genomic data and items like patient reported outcome measures.
- Lastly, you have so called new data. In this, I include the massive link data that surrounds us all such as data that can be collected from fitness centres or diet apps as well as information on what we purchase, where we travel, and almost every other aspect of our lives.

If you combine the data from all the patients a team treats, you can see that we will shortly have a comprehensive picture of the care a team delivers. We are looking now at how this

global information can then be used to **impact on clinical decision making, professional development and quality improvement.** Another way to look at this is to consider the following three domains of health, that being clinical practice, quality improvement and professional development.

4.9.7. Improving care

eHealth advantages

- Improved consumer access
- Care stays local
- Benefits smaller centres
- Expands provider reach
- Diagnosis on the move
- More services delivery options
- Fast track diagnosis
- Integrates care and daily life
- Supports professional development
- Offers professional flexibility.

4.10. Telehealth and the new healthcare model

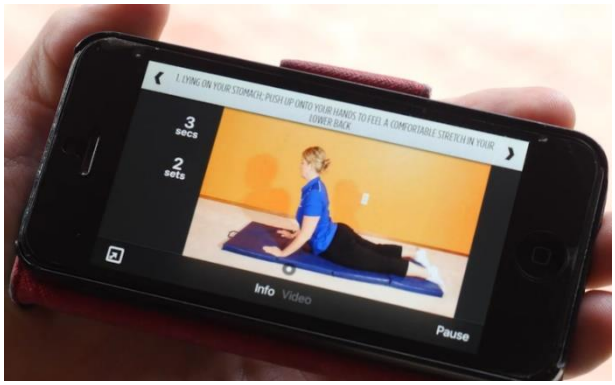
These include telemedicine, tele health, mobile health, teleconferencing and video conferencing. Regardless of the terminology or technology platform we use, the key to using technology in communication is how we integrate this into our existing models of care.

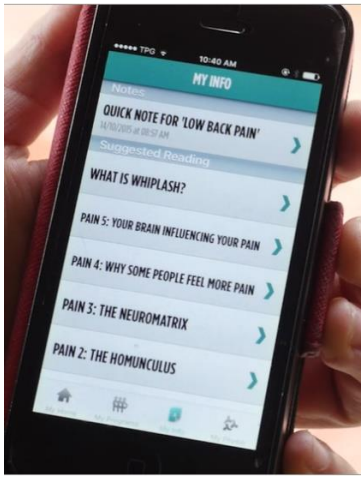
And at the centre, we focus on four main things.

- Between the hospital communication

- Within the hospital,
- Hospital to community communications as well as,
- Hospital back to patient's home.
-

4.11. Using app to personalise healthcare





Various app of eHealth used in India-

MedHarbour, MediMetry, Continuous care, Practo, NetMeds, Portea, MedGenome, Goqii, Lybrate, Attune, WelcomeCure, 1mg, Relisys, Buypy health, Physiohealth, Orderly health.

Recently an app launched only for COVID is **Aarogya setu.**

5. AFFECT OF COVID-19 ON E-HEALTH

In India an online doctor consultation are in rush of about 50 million that is approx. 500% as the lockdown start in India due to pandemic crisis (since March). According to Practo out of telemedicine 80% are first users and 44% are from the non-metric cities. And the doctor patient visit are approx. dropped by 67%.

5.1 How eHealth help providing treatment during an outbreak

- Virtual examination- safe and secure for health worker
- Reduce travel and contact with patients.
- Help patients with mild corona to get their treatment at home.
- Give right and brief information about the outbreak
- EHR provide recorded data.
- Quick access to a doctor in case of an emergency.

5.2 Increased utilization of eHealth apps during pandemic

The graph clearly shows the increased utilization of various eHealth app during pandemic crises. Since due to a pandemic crisis for treatment going to hospital is very difficult plus also contains a large risk of corona due to contact with persons. Currently, everyone wants their facilities at home. Either for food supply or healthcare. Thus, eHealth a form of digital marketing plays a major role by providing healthcare delivery at home. And motivate the quotation Stay safe stay at home.

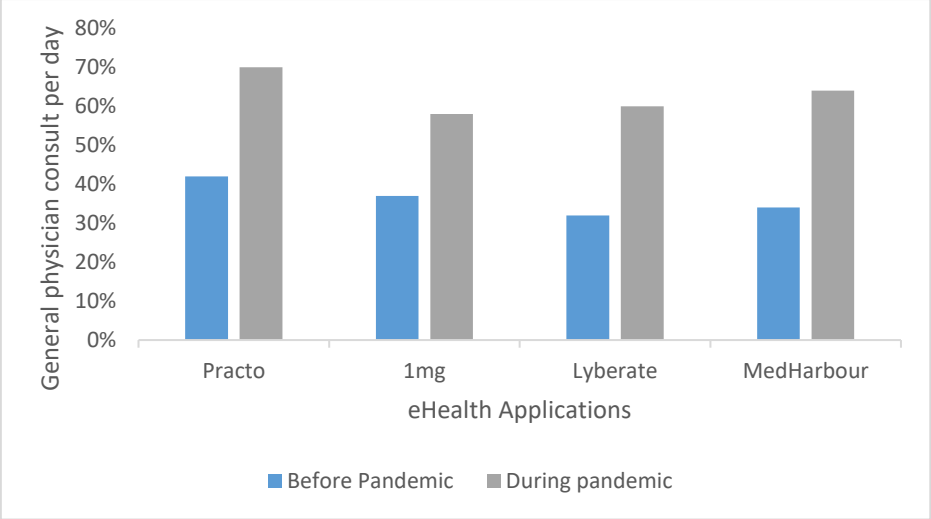


Figure 8: Comparison of eHealth apps

5.3 Role of eHealth in COVID-19

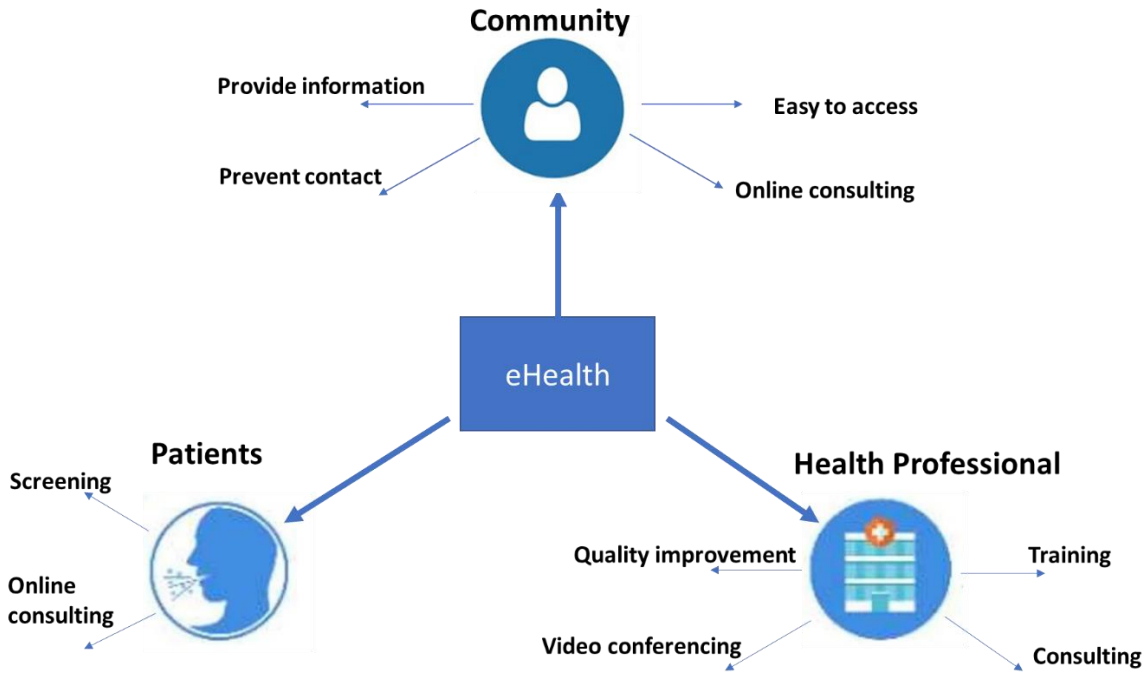


Figure 9: How eHealth used during COVID-19

During the pandemic, eHealth plays an important role by providing the healthcare at home. Helps medical staff to discuss their issue at home, through video conference they can share their views and make a treatment plan. Electronic health records help in monitor and store data, history of patients. Since this is an outbreak no one knows about this, their treatment, how to

manage for this eHealth provide training and learning to all including community, patients, and medical staff. Vital sign screening has done through digital marketing easily and comfortably. The focus is to prevent the contact of person to person.

6. LEARNINGS FROM COURSE

- Knowledge about eHealth
- Use of eHealth
- Scope of eHealth
- Future of eHealth
- How we use data on this app
- How patient become part of eHealth
- Why eHealth
- How data improve our performance.