MS INSTITUTE OF NURSING

SUBJECT- NURSING RESEARCH AND STATISTICS

SUBJECT COORDINATOR- MS. MANSHA SINGH

UNIT I
Scientific methods

DEFINITION OF SCIENTIFIC METHODS

Scientific methods are defined as controlled, systematic investigations that are rooted in objective reality and that aim to develop general knowledge about natural phenomena.

CHARACTERISTICS OF SCIENTIFIC METHODS

Based on the above definition the characteristics of scientific methods are as follows;

- They are orderly and systematic processes.
- Scientific attempt to control external factors that are not under direct investigation.
- Their findings are based on the empirical evidences.
- Findings of scientific methods can be generalized which means that they can be used in situations other the one under study.
- They are based on assumptions or hypothesis.
- They are basically conducted to develop or test theories.

PURPOSES OF SCIENTIFIC METHOD

The basic purposes of scientific methods are description, exploration, explanation, prediction, control, prescription and identification of relationship of the facts.

LIMITATIONS OF SCIENTIFIC METHODS

- Moral or ethical problem
- Human complexity
- Measurement problem
- External variable control problem

STEPS OF SCIENTIFIC METHODS

The steps of scientific methods depend on the types of the study which follows either a qualitative or a quantitat approach. However the main steps used in any in any scientific method or approach are as follows;

- Selecting the topic and identifying the problem.
- Defining the objectives of the study.
- Reviewing the literature from theory and other related studies.
- Defining concept and variable to be studied.
- Stating hypothesis about expected observations or phenomenon to be studied.
- Identifying assumptions and implications.
- Determining the ethical implication of the proposed study.
- Describing the research design and methods for data collection.

- ➢ Defining study population and sample.
- ➢ Planning the data analysis and discussion.
- ➢ Collecting data from subjects.
- ➢ Analyzing and interpreting data
- ➢ Communicating findings of the study

RESEARCH

INTRODUCTION –Nursing is considered one of the oldest arts yet find place among the youngest of profession. I an involving profession which needs a continuously growing and expanding body of knowledge, which can developed only through research.

Research is one of the few ways by which knowledge can be generated and discipline can maintain its professio status and growth. Research is a systematic inquiry that uses disciplined method to answer questions or so problem. The ultimate goal of research is to develop refine and expand a body of knowledge. Nursing nurs research is a systematic inquiry designed to develop knowledge about the issue of important to nurses, includ nursing practice, education and administration.

Nursing research provide the scientific basis for the practice of the profession. It uses multiple diverse methodologi philosophical and theoretical approaches to understand the patterns of newer acute and chronic morbiditi prevention or delayed onset of disease or disability or slowing the progression there of finding effect approaches to achieve and sustain optimal health and improvement of the clinical setting in which care provided. Recently, the, main focus of the nursing research is on education methods that best prepare

MEANING OF RESEARCH AND NURSING RESEARCH
RESEARCH – The word research is derived from the French term tram recerchier, a compound word composed of a prefix, re and a verb search. Re means 'intensive' once again, anew or afresh and search means to look for something or examine closely and carefully, to look for information, to test and try, or to prove. Also mentions that research means carefully examine or to search again.

DEFINITION OF RESEARCH
'Research is a systematic method of exploring, describing, explaining relating or establishing the existence of phenomenon the factors that cause change in the phenomenon and how the phenomenon influences other phenomena. '

"Research essentially is a problem–solving process a systematic, intensive study directed towards full scientificknowledge of subject studies "

Research is a scientific, systematic, controlled orderly and objective investigation to develop refine and expand body of knowledge

"Research seeks to generate an answer to a problem as well as suggesting additional questions in need of further inquiry"

"Research is the process of systematically obtaining accurate answers to significant and pertinent questions by the use of the scientific method of gathering and interpreting information"

NURSING RESEARCH
The ultimate purpose of nursing is to provide high quality patient care. Clinical nursing practice without research is based on tradition without empirical evidences. Research is needed to evaluate the effectiveness of nursing treatment modalities to determine the impact of nursing care on the health of the patients or to test theories. Nursing practices are undergoing tremendous changes and challenges.

DEFINITION OF NURSING RESEARCH

"Nursing research refers to the use of systematic, controlled, empirical and critical investigation in attempting to discover or confirm facts that relate to a specific problem or question about the practice of nursing

(Walls and Bausell, 1981)

"Nursing research is a way to identify new knowledge, improve professional education and practices and use of resources effectively

"Nursing research is defined as a systematic search for knowledge about issues of importance to nursing."

(Polit and Hungler, 2001)

Nursing research is a systematic approach to gathering information for the purpose of answering question and solving problem in the pursuit of creating new knowledge about nursing practice education and policy.

(Hek and moule 2006)

NEED AND PURPOSES OF NURSING RESEARCH

Nurses engage in research for a number of reasons as professional, nurses seek to establish a scientific base of knowledge for nursing. the systematic accrual of nursing information enable nurses to better define the parameters of nursing document the unique contribution nursing makes to health care, determine the effectiveness of nursing action develop theoretical frameworks for clinical practices and enhance more informed clinical decision making. There is growing consensus that knowledge of nursing research is needed to enhance the professional practices of all nurses.

Research is a fundamental essential prerequisite for any profession .the specific purpose of nursing research includes identification, description, exploration, explanation, prediction and control of facts. , Therefore nursing research enables nurses in the following ways.

- Develop, refine, and extent the scientific base of knowledge, which is required for quality nursing care, education and administration
- Enhance the body of professional knowledge in nursing
- Provide foundation for evidence based nursing practice.
- Help in expansion of knowledge, which is essential for continued growth of nursing
- Enhance their professional identity as is an essential component of any profession
- Identify nursing care practices that make a difference in health care status of individuals and are cost effective
- Enhance accuracy of different nursing educational and administrative techniques.
- Developed and refine nursing theories and principles.
- Solve the problem or answer question related to nursing practices, nursing education.

CHARACTER OF GOOD RESEARCH

Research employs scientific methods. Good research is systematic, logical, empirical and also replicable. However one expects that a good research must satisfy the following criteria.

- Orderly and systematic process: - A research can only be considered good if it is conducted in an orderly and systematic way.
- Based on current professional issues:- resolving current issues of any discipline is one of the fundamental purpose of any research good research must be based on the current professional issues so that particular discipline can be up to date with solution to professional concerns
- Begin with clearly defined purposes: - A research can only be conducted in effective manner if it Started with clearly define purpose

- Emphasize to develop refine and expand professional knowledge: - the main purpose of the research is to develop the new knowledge or refine the existing professional knowledge. A good research is always directed toward expansion of professional body of knowledge
- Directed toward development or testing theories: - theory development and testing is a systematic process of enquiry in a discipline   only a good research can make it possible to develop or test a theory
- Finding solution of problem: - finding answer or solution to professional problem is another important purpose of a research. Therefore a good research is always directed toward finding an answer or solution for the professional problem.
- Dedicated to develop empirical evidence: - a good research always strives to develop empirical evidences .Another important purpose of the research is to generate empirical evidence, which can be used to improve the professional practices
- Strives to collect first-hand information /data: - A successful research is conducted by collection of data directly from subject by different methods like questioning, interviews or observation.
- An objectives and logical process:- research information   collects through subjective means or in haphazard manner Will never lead to satisfactory result.
- Use of appropriate methodology: - a good research always employs the most appropriate and suitable methodology.
- Conducted on representative sample: - generalization of research finding is only possible if study is conducted on a sample which has characteristics similar to the population of the study.
- Generate findings to refine and improve professional practice: - A research cannot be considered successfully conducted until and unless it contributes towards refinement and Improvement in professional practices as per the need of need.
- Conducted through appropriate use of methods and tools of date collection: - based on the nature of phenomenon and subjects under study methods and tool of data collection will be different.
- Use of valid d reliable data collection tool:- an evidences generated from a research activity can only be considered valuable if they are generated through valid and reliable research tools .
- Carefully recorded and reported: - A research can only be considered good if research information is carefully recorded and reported because in absence of careful recording and reporting, the evidences generated during research may be covert in nature.
- Adequately and appropriately analysed research :- a research activity is incomplete activity is incomplete and poor until gathered data is adequately data is adequately and appropriately analysed using standardized and accepted methods of data analysis.
- Patiently carried out activity: - Research cannot be carried out in hurry: it need lots of time and patience.
- Researcher's expertise, interest, motivation and courage:-It is largely believed that a good research activity needs expertise, interest motivation and courage among researchers
- Adequately communicated:- a research cannot be considered good until the information generated is adequately disseminate to its users

RESEARCH PROCESS

INTRODUCTION

A research study begins with identification of a research problem or a research question and ends with finding out and dissemination of a solution or an answer for that particular research problem or research question. The steps in quantitative and qualitative researches are not similar there exist differences in both the processes Therefore. They are discussed separately in this chapter However,

before discussing the research processes, some basic research terms are described here for orienting the readers with common research terms or jargons.

QUANTITATIVE RESEARCH PROCESS OVERVEIW

Quantitative research in a formal objective, and systematic process for generating, information about the world. Quantitative research is conducted to describe new situations, events or concepts. In quantitative research study, variables are preselected and defined by the investigator, the data in collected and quantified (i.e. translated into numbers), and then statically analysed often with the view to establish cause-and-effect relationship among the variables. The research process starts with the Identification and formulation of the research problem and ends with the dissemination of research findings.

FORMULATION OF RESEARCH PROBLEM; - The foremost step of a research process is to discover an interesting and research worthy problem. It is such an important step that the whole process can get wasted if the research problem is not clearly understood or defined .therefore any good research needs a god research problem. The PICOT model also serves as a guide for formulating a clinical research question research problem

- **P-Population;** y (Patient); what patient population is you interested in?
- **I-Intervention;** what is your investigational intervention?
- **C-Comparison group** (Comparator intervention); what is the alternative to compare with intervention?
- **O-Outcome of interest;** what do you intend to accomplish, measure improve or affect
- **T-Time:** What is the appropriate follow-up-up time to assess outcome?

To formulate an interesting, creative, noteworthy and indicative research problem the researcher mast ensure features of originality solvability, and feasibility of research problem as well as the need to take into account the following dimensions;

- **Substantive dimension;** Is the research problem clinically or theoretically important
- **Methodological dimension;** what is the best possible way to study this problem?
- **Practical dimension;** Are adequate resources available to conduct the study?
- **Ethical dimension;** would this problem respect the rights of the study subjects?

Determining study objectives: There must be a clear direction to every research project, and objectives certainly serve this purpose. Therefore, researchers must have a list of objectives for the study, which provides the guidelines for the researcher as to what exactly the course of a particular research study. There may be general and specific objectives for a research project.

This step of the research process also includes writing operational definitions of the variables under study. Where researchers have clarity about what is to be studied in a particular research question or research problem.

Review of literature; a literature review is a summary of previous knowledge generated c of study. It is believed by researchers that research cannot be conducted in a vacuum, bereft of the previous knowledge available, but that it requires a foundation of existing knowledge to plan and conduct a good research.

This knowledge base can only be acquired through literature review from several sources, such as books, journals, research reports, unpublished theses, newspapers, magazınes, and other current popular electronic database. Review of literature helps the researchers to understand what is already known a topic and what needs to be further investigated. An effective literature review needs certain basic skills in researchers, such as critical thinking, brainstorming, reading comprehending, analysts, synthesizing, and summarizing.

Developing conceptual framework: The basic aim of quantitative research in most disciplines is to develop, refine, or test theories. Nursing profession is considered as one of the oldest arts, but one among the youngest sciences, where there is great need of developing new theories or refining / testing existing theories to expand the body of professional knowledge. These conceptual frameworks not only provide meaning to the research problem, but also help in developing hypothesis or assumptions for the research studies

Formulating hypothesis / assumptions: Hypothesis is an assumed statement suggesting an answer to a question, which may or may not be true In simple words, it translates the statement of a problem into a clearly understandable and easy to-comprehend prediction of what is expected to be the outcome of the study, which is either accepted or rejected base on the empirical data generated at the end of the research process

For example; consider this research statement, A prospective cohort study on alcohol intake and incidence of liver disease among people of an urban community at Ludhiana. Here hypothesis may be considered as' alcoholics have higher incidence of liver disease.

Assumptions are statements that are to be tested to be considered true. Before they have been scientifically tested. In other words, assumptions are the general beliefs of the people at large that are held to be true, but have not necessarily been proven.

For example, satisfaction is influenced by the preconceived expectations of the customers a general belief may use it as an assumption in a customer satisfaction study

Selecting research approach / design: A research design is the systematic plan to obtain answers to research questions. In a broader sense, research design is the blueprint of research study, which enables the researcher to know on whom, what, when, where, and how the study will be conducted.

- **Who:** Specifies the subject (s) under study, for example, patients, families, groups,etc.?
- **What:** Specifies the variables that are to be focused upon and measured.
- **When:** Specifies the time of the study, duration, and frequency of the observations.
- **Where:** Specifies the setting of the study, that is, where the researcher will be conducting the study
- **How;** Specifies how the data will be collected.

For example, through manipulation of the variables in experimental study under random assignment or simple questioning, inter- view, or observation of a phenomenon without manipulation and control over variables. Basically, there are three approaches / designs for the quantitative research experimental, quasi -experimental, and non-experimental.

Experimental: In experimental researches, there is random assignment of subjects, and an availability of a control group to compare with the experimental group, and manipulation of independent variable to observe effect on dependent variable in an experimental group or there could be two or more different experimental arms, to compare the efficacy/effectiveness of different interventions in two or more experimental arms

An experiment must have three characteristics that is intervention/manipulation, randomization and control.

Quasi-experimental: Quasi-experimental studies involve manipulation of independent variables to observe the effect on dependent variables, but usually there is absence of randomization or even control group. Quasi-experimental research design is more frequently used by nurses.

Nonexperimental: Nonexperimental research design is commonly known as observational research design, which involves study of research variables without manipulating them in natural setting for the purpose of description, exploration, explanation or identification of correlation between two or more variables.,

No experimental research designs may be further classified as descriptive, cross-sectional, longitudinal, correlation, case-control and cohort research designs.

Specifying the population: In quantitative essential to learn about the characteristic the subjects pose and dearly define the group of subjects or objects under study. Research population is an aggregate of all the subjects or objects with specific characteristics. Population specification helps the researcher to plan and develop an effective methodology and tools for the development of empirical evidences.

Developing tools(s) for data collection: This in the most important and crucial step of the researcher process essential to devise methods and tools to measure the research variables as objectively and accurately as possible The plan and design of tools for data collection depends on several factors, such as type of research design, variables, subjects, researcher's expertise, available sources, and time for study.

In quantitative research, usually structured or semi structured tools are used for data collection, which requires a lot of constructive efforts, such as review of relevant content, brainstorming, expert suggestions computing reliability.

Establishing ethical considerations; In nursing science, most of the research is conducted on human participants, where it becomes more important to establish ethical consideration .During research studies a researcher can address the ethical issues and may establish ethical considerations by taking the following measures;

- Obtaining ethical approval from Institutional Ethical Committee (IEC).
- Taking informed consent from participants
- Avoiding errors in data collection.
- Obtaining the permission from competent authority of a particular healthcare facility area to conduct the study
- Doing justice to participants in analyzing data
- Maintaining confidentiality of the information and anonymity of subjects.

Conducting pilot study/try-out of tool: Pilot study is a kind of small-scale rehearsal on the subjects, but these subjects are not a part of the actual study Pilot study is conducted to ensure the feasibility of the study and revise methodology and tool (s) of the study in case any shortcoming is found

Sample selection: It is not practically possible to conduct study on entire population. Therefore, researchers must select a representative part of the population. A sample can be selected by using either probability or non-probability sampling technique, where choice of sampling technique depends on several factors, like nature of the study, availability of time, money resources, and researchers' knowledge about population,

Data collection: It is the most time-consuming step of the research process, which involves direct or indirect interaction with respondents to gather information pertaining to the topic under study. Data collection requires adequate planning patience, communication, interpersonal relationship, and recording skill. Data could be collected through questioning, interviewing, or observation methods

Preparing data for analysis: In quantitative studies, careful checking of every tool for its completeness and coding is the main activity during this step of the research process. It must be ensured that one code specifies only one piece of information, and it should maintained carefully to avoid any error.

Analysis and interpretation of data: In quantitative research studies numerical data must be organized in an orderly and sequential manner, and processing is required for analysis and interpretation of data using appropriate descriptive and inferential statistics, so that research question can be adequately answered in numerical form. data may be analysed by using descriptive be analysed either by manual calculation or by using Statistical software Programmes, like Statistical Program for Social Sciences (SISS), Epi-info,

STATA, Minitab PASS and so on Data is presented through tables, graphs, and charts to facilitate performance of data.

Disseminating the research findings: Research may fail in achievement of its objectives, if findings are not disseminated to its users. Research findings may be communicated through writing of research thesis, article, or presenting an oral research report at scientific professional conferences. They must be communicated in a standardized format according to the international, national, or institutional guidelines. Generally, each journal provides its own specific format for submitting a research article for publication.

QUALITATIVE RESEARCH PROCESS: OVERVIEW

Qualitative research is a systematic and subjective approach to describe events or life experiences, and to give them intended meanings. It is an interdisciplinary, Tran's disciplinary, and sometimes counter disciplinary field. The process of qualitative research is relatively less formally planned, where planning and execution of research moves hand in hand. Therefore, the steps of qualitative research process are slightly different from that of quantitative research.

Identifying research problem area; in qualitative research initially a broad research area is identified, and then focus may be narrowed down as the researcher gets more familiarity and experience in the research setting. Qualitative research begins with a general topic of research problem and the group or population expected to be studied.

Formulating broad study objectives: Objectives serve as guidelines to conduct a research study; however, in qualitative studies, only broad objects may be planned, which may later be modified based on the need of the research.

Review of literature: There are different schools of thoughts about literature review in qualitative studies. Some eminent researchers believe that literature review in qualitative studies may become a source of bias, since qualitative research is a subjective approach of studying a phenomenon. Moreover, in qualitative studies, understanding the phenomenon or population under study is very minimal; therefore, literature review would help the researchers to gain some amount of prior information to have an effective planning and execution of the research project.

Entry in the research setting; as in qualitative study the research is not much aware about population and phenomenon and thus this is an important step for further planning and execution of the research process. Entry in research setting requires prior permission from competent authorities as well as contacts with key people in the area of the interest. In ethnographic studies these people are called key informants.

Selecting research approach/design; there are a few common designs used in qualitative studies namely phenomenology, grounded theory ,ethnography case study , historical research action research and philosophical inquiry, choice of a research design in qualitative study depends on the nature of the phenomenon under study. For example

- **Phenomenological design:** It may be used if the researcher is interested in a description of experiences of people, for example a study on experiences of people who survived the tsunami disaster in the coastal states of India.

- **Ethnographical design:** it involves the collection and analysis of data about cultural groups. In ethnographic research, researchers live and become part of their culture to explore the sociocultural practices and ritual customs of the population under study; For example an ethnographic study on the feature, critical attributes processes and benefits of self-help groups of women living with chronic alcoholic husbands in selected villages of district belagavi Karnataka

- **Grounded-theory approach;** this approach may be used by researchers to collect data; for example if they are interested in learning about the experiences that the survivors went through to resolve their crisis during the tsunami disaster.

- **Case study;** Case studies are in-depth examination of people, or institutions for example case study on emergency services in Civil Hospital of Ludhiana, Punjab.

- **Historical research;** this approach of qualitative research is concerned with identifying locating, evaluating, and synthesizing data from the pant; for example a study on evolution of nursing research in India.

- **Action research design;** this design may be used it; for example, the researcher is interested in learning about how nurses worked with tsunami survivors to reach a resolution of the crisis situation.

Selecting a small sample: Qualitative studies are in-depth inquiries; therefore, generally a quite small sample (10-15 subject) is selected for study. However, there are no defined set of rules for exact sample size for a qualitative study, even a single case can be a sample in the case study design of qualitative research, while data saturation principle can be used to decide the ample size for a particular qualitative research study.

Generally the size of the sample in qualitative research is always smaller than the one in quantitative research. In qualitative research, depth and quality of data is more important than quantity of data.

Establishing ethical considerations; same as quantitative study, qualitative study also develops and plans to address the ethical aspects related to the participant. This is a more important concern in qualitative study because of the more intimate nature of the relationship that typically develops between the researcher and the study participant.

Ethical issues can be addressed and established by takıng informed consent from participants, avoiding errors in data collection, doing justice to participants in analysing data, and maintaining the confidentiality of the information and anonymity of the subjects

Planning tools for data collection: Tools used for data collection in qualitative research are generally semi-structured or unstructured Most of the items are open-ended, the answers of which should be taken in the form of narrations. Data may be collected through video-taping, tape-recording, focus-group interview, photographs, reflective journals, field notes, transcripts, cumulative diaries, and so on

Collecting data: In qualitative research, data collection is the most crucial and time consuming step of the search process interview and observation are two most common types of data collection method used in qualitative studies which provide greater flexibility in data collection that is of prime importance in qualitative studies. Generally, data is collected either by tape-recording / video recording the session, detailed notes on the information, or both.

The use of focus group interview has also increase in nursing qualitative studies. Each participant may not get an equal opportunity to express or may be reluctant to answers in a group

Organizing data for analysis: Before analysis, data is organized for data analysis and in- terpretation by following techniques;

- Listing
- Categorizing
- Comparing
- Laddering

Analysis and interpretation of data; in qualitative studies, analysis of data actually begins with data collection, and some of the researches argue that there no separate step of analysis of data in qualitative research. Analysis of data in qualitative research usually involves an examination of words rather than numbers,

as is the case in quantitative research. In qualitative studies, large amount of data collected in the form of words, which could be several thousand pages of notes. Therefore data analyzes in qualitative studies is a challenging task

There are no universally accepted rules for analysis of qualitative data. However, qualitative data can be analysed by using descriptive coding, indexing, narrations, integrative diagrams, thematic analysis, etc.

Disseminating the research findings: Research finding may be communicated by writtative research thesis, article, or presenting an oral research report at scientific professional conferences. Research finding must be communicated in a standardized format according to the international, national or institutional guidelines

UNIT II
RESEARCH PROBLEM

Problem is a question that a researcher wants to answer or a problem that a researcher wants to solve. Identification and formulation of a research problem is the first step of the search process. However, it is considered as one of the most challenging and difficult phase of any research project. It is believed that selection of a good research problem is a discovery in itself.

Selection of a research problem depends on several factors, such as researchers know ledge skills, interest, expertise, motivation and creativity with respect to the subject of inquiry.

Researcher needs to ensure that a selected problem has high significance and implication for his or her profession, as well as it should also be a suitable, feasible, testable, and solvable research problem. It is believed that most of the good research studies need lots of time for selection of search problem.

IDEFINITION

According to Kerlinger, "A problem is an interrogative sentence or statement that asks what relation exists between two or more variables. The answer to questions will provide what is having sought in the research"

"A research problem is an area of concern where there is a gap in the knowledge base needed for professional practices "

The research problem and problem statement are frequently seen as synonymous but two aspects are really quite different. A problem statement is not merely a research problem or purpose of the study, but it is a well-structured formulation of what actually the problem is, what is not well understood, and what is lacking, which is to be discovered to solve the problem. Problem statement, especially in quantitative studies, generally has six components;

➢ Relevance of the study
➢ Title of the study
➢ Operational definitions of the variables
➢ Objectives of the study
➢ Delimitations of the study
➢ Scope and limitation of the study

PURPOSE OF RESEARCH PROBLEM

The research purpose is a concise, clear statement of the specific goal or aim of the study. The goal of a study might be to identify, describe, explain, or predict a solution to a clinical problem and involve questioning skill &critical thinking skill.

OBJECTIVES OF RESEARCH PROBLEM

➢ Determine the leadership behaviors of nurse managers.

- ➢ Determine whether the use of a certain leadership behavior by nurse managers make a difference in staff nurse managers make a difference in staff nurse job commitment.
- ➢ Determine whether the use of a certain leadership behavior by nurse managers make a difference in staff nurse empowerment.
- ➢ Determine the relationship between staff nurses empowerment and organizational commitment.

Sources of Research Problem

The common sources from which a researcher may find ideas to identify and formulate research problem include

- ➢ **Personal experiences:** Day-to-day personal experience of a researcher may be serve good source of ideas to formulate a research problem. There may be so many such life experiences of a researcher which could be used to develop a research problem.
- ➢ **Practical experience:** Nurse gets plenty of ideas to formulate research problems from their clinical experiences. Every curious nurse has several questions to be answered which are encountered during clinical experience. For example, a nurse finds that unrestricted visiting hours in surgical wards reduced the analgesic demand among postoperative patients. I
- ➢ **Critical appraisal of literature:** When we critically study books and articles relating to the subject of our interest, including research reports, opinion articles, and summaries of clinical Issues, pertinent questions may arise in our mind. These may strike reader's mind indirectly by stimulating imagination and directly by stating what additional research is needed. For example, a nurse reads an article on the prevalence of the pin site infection among patients with external fixators, while readıng this article nurse learns that there is lack of consensus about pin site care This information may serve as a basis to formulate a research problem.
- ➢ **Previous research:** A body of knowledge should be developed on sound foundation research findings. Usually at the end of a research further research problems are suggested based on the shortcomings of previous research, which can be investigated. Further refinements may be made in the experimental treatments, or more appropriate outcome measures may be identified.
- ➢ **Existing theories**; Research is a process of theory development and theory testing Nurses from other disciplines in their practices. If an existing theory is used in developing a researchable problem, a specific statement from the theory must be isolated. Generally, a part or parts of the theory are subjected to testing in the clinical situation The testing of an existing theory is definitely needed in nursing, therefore, they serve as good sources of research problems or
- ➢ **Social issues:** Sometimes, topics are suggested by more global contemporary social or political issues of relevance to the health care community For example, HIV / AIDS, female feticide, sexual harassment, domestic violence, and gender equality in health care and in research are some of the current social and political issues of concern for health care professionals. An idea from a study may stem from a familiarity with social concerns or controversial social issues.
- ➢ **Brainstorming:** Brainstorming sessions are good techniques to find new questions, where an intensified discussion among interested people of the profession is conducted to find more ideas to formulate a good research problem. For example, ideas for studies may emerge from reviewing research priorities by having brainstorming session with other nurses, researcher or nursing faculty.
- ➢ **Intuition:** traditionally intuitions are considered good sources of knowledge as well as sources to find new research problems. It is believed that reflective mind is good sources ideas, which may be used to formulate a good research problem a

- ➢ **Folklores:** Common beliefs could be right or wrong. Example, it is generally believe that studying just before the test decreases the score. We believe we should not study before test to relax our mind. Researchers can conduct a research study on whether should study before the test or not .
- ➢ **Exposure to field situations:** During field exposure, researchers get variety of experiences which may provide plenty of ideas to formulate research problems. For example, while working in field a researcher observed a specific traditional practice for cure of a disease condition which can be used as research problem to investigate its efficacy.
- ➢ **Consultations with experts:** Experts are believed to have sound experience of their respective field, which may suggest a significant problem to be studied. In addition, experts may help in finding a current problem of discipline to be solved, which may serve as a basis for formulation of research problem.

Criteria for Selecting a Good Research

Problem One common and used acronym to define the criteria for a good research problem or question is FINER, where F stands for feasible. I for interesting N for novel, E for ethical, and R for relevant However, there are many factors that should be considered while deciding credibility and of a particular research question for a scientific investigation Some of the most emsential factors are discussed below

Significance to nursing profession: A problem that a researcher selecting should have significance to nursing profession or it will not serve any purpose A research problem is significant for nursing profession when it is directed to develop or refine the body of Professional knowledge A research problem could be considered mean for profession if a fulfils the following criteria

- Benefits nursing profession and patients, nurses and health falls fraternity the study.
- Improves clinical nursing practices through the results
- Promotes nursing theory development or testing
- Provides solutions of current nursing practice needs
- Generates information to get practical implications for nursing profession

Original: it is fundamentally considered that every researchproblem should be new and knowledge is used selecting a research problem, so as to extend the growth of existing body of knowledge in a profession

Feasible Feasibility is an essential consideration of any research project. Regardless of how significant or researchable a problem may be, the feasibility of research problem reference to time, availability of subjects, facilities, equipment and money and ethical considerations should be checked It will help the researcher to decide whether selected problem is appropriate or inappropriate and study can be actually carried out or not

Time: A nurse might be interested in studying sibling relationships among quintuplets Knowledge of the incidence of quintuplet births would certainly discourage considering research on this particular population unless the researcher plans this lifetime project. So, time is always a factor to be considered,

Cost: All research projects cost money; some studies are much more expensive than others. The researcher must consider realistically the financial resources available.

Equipment and supplies: All research projects require some type of resources. TH before making the final decision to conduct a study, an accurate determination of the needed equipment and supplies should be ensured. Some questions that should be answered before beginning a research project include

- What is the equipment that will be needed?
- Is this equipment available and in proper working order?
- Is there a qualified operator of the equipment?

- Are the necessary supplies available or can they be obtained?
  If the researcher takes into consideration equipment and supplies in the ear of a research project, there are less chances of the project being revised or disclaim because of equipment or supply problems.

Administrative support: Many research projects require administrative sup nurse researcher may find it very difficult to conduct research independent. Financial as well as psychological support from administration is very helpful. Know your superiors support your research efforts can be a very powerful motivating force.

Peer support: Many research ideas have been developed because potential research received no support from their peers. One of the best ways to determine are problem is through interactions and discussions with other nurses. A climate interest in nursing research is essential among the members of the nursing profession.

Availability of subjects: A researcher may believe that study subjects are readily available for the study but this may not be the case

Researcher's Competence: A research problem can only be feasible if it is in accordance with researcher's competence, where researcher' is capable of handling given research problem

Solvable / Researchable: Problem selected is considered good only fi is solvable that chances of insolvability of problem should be minimized

Current: good research problem must be based on the current problems and needs of as profession so that results generated will be of more use

Interesting: A research problem can only be considered good if it in accordance with searcher's field of interest.

FORMULATION OF RESEARCH PROBLEM

Formulation of research problem is a complex and long process which includes following steps

Selection of a research area: Formulation of a research problem begins with selection of a broad research topic from personal experience, literature, previous research, and theories an which researcher is interested and has significance for nursing profession

Reviewing literature and theories: After getting a broad idea for research, he or she needs to review the nursing literature and theories. Literature is reviewed to know what has already been done in this selected area of research. Review of nursing theories provides an opportunity for nurse researcher to plan a research problem to contribute towards either testing or development of a theory / conceptual model.

Delimiting the research topic: In this step, researcher proceeds from a general research area of interest to more specific topic of research to conduct a study. For example, initially a researcher decides to conduct a study on female feticide, later in this stage researcher limits it to specific research topic. In this stage, a clearly identifies variables population, and setting of research study. At this stage research is quite clear about the phenomenon to be studied, where, and on whom.

Evaluating the research problem: Once researcher is clear about the specific research problem next the research problem must be carefully evaluated for its significance, research ability, and faith Feasibility of the research problem should be evaluated for time, cost, availability of sub resources, administrative and peer support, ethical consideration, and researcher's competence interest.

Formulating final statement of research problem: after establishing the significance, research ability, and feasibility then research finally formulates a final statement of the research problem. A statement of research problem could be declarative or interrogative format. Be for time, cost, of and resources, and peer ethical s and research ability, and then finally a final of a research A of problem could be in or format.

'A descriptive study on of patients in problem for example: intensive care units of PGIMER, Chandigarh.

REVIW OF LITERATURE

INTRODUCTION: - The review of literature is a summary of all the review from various research literatures related to the v current study carried by a researcher .it helps to discover what is already known about the research problem and what more has to be done. Review of literature is one of the most important steps in the research process. It is an account ofwhat is already known about a particular phenomenon. The main purpose of literature review is to convey to the reader about the work already done and the knowledge and ideas that have been already establish in a particular topic of research

according to adedellh and Levin, the material gathered in literature review should be included as a part of the research data since it influence the problem and research design it can be used to compare the results and findings for the current study

DEFINITION OF REVIEW OF LITERATURE

"A literature review is a body of text that aims to review the critical points of knowledge on a particular topic of research"

(ANA, 2000)

"A literature review is an account of what has been already established or published on a particular research topic by accredited scholars and researcher"

(University of Toronto, 2001)

"An organized written presentation of what has been published on a topic by the scholars."

(Burns and grove, 2005)

"Literature review is defined as a broad, comprehensive, in depth, systematic critique and syntheses of scholarly publications, unpublished, print and online materials audiovisual materials and personal communications"

(S.K. SHARMA, 2005)

CHARACTERISTICS OF GOOD QUALITY REVIEW OF LITRATURE

❖ A good review of literature must be comprehensive
❖ It should include up-to-date references.
❖ It should be systematic.
❖ It should be reproducible.
❖ It should be free from bias.
❖ It should be well written.
❖ It should be in the fro, of sum of its parts.
❖ It should be clearly searched and selected.
❖ Accurate references should be given in the review.

FACTORS AFFECTING REVIEW OF LITERATURE

❖ **Researchers background; -** an experiences find it easy to prepare a review of literature than a beginner.
❖ **Complexity of the research project: -** it is easy to collect review of literature for simple and easy research projects than complex ones.
❖ **Availability of resources: -** availability of resources like computer, internet facility, online and offline journal subscription makes it easy to prepare a good review of literature.
❖ **Study time frame: -** to conduct a relevant review of literature sufficient time is needed
❖ **Availability of support system: -** if there are many research scholars involved can be gathered.

PURPOSE OF REVIEW OF LITERATURE

❖ It helps to identify what is already known about a research problem.

❖ It helps to build on previous knowledge.

❖ Many published research studies contain recommendation for future research from which we can get idea for a new research study.

❖ It makes researcher know what research has already been done in a particular area so as to avoid duplication

❖ It is necessary to narrow the problem to be studied

❖ Identify questions a body of research does not answer

❖ It helps research to get acquainted with the relevant theory strategies tools and instruments for conducting the research

❖ It helps to understand the different ways of conducting the research study

❖ It helps to identify comparative data so helps in interpretation and discussion of previous study.

IMPORTANCE OF LITERATURE REVIEW

Literature review provides a practical guide to a particular topic. For health care professionals they are useful reports that keep them updated with what is present in the field .comprehensive knowledge of the literature of the field is essential to most research studies. Review of relevant literature can help in fulfillment of the following objectives;

❖ Identification of a research problem and development or refinement of research questions.

❖ Generation of useful research questions or projects or activities for the discipline.

❖ Determination of any gaps or inconsistencies in a body of knowledge

❖ Provides evidence that a selected research problem is of importance.

❖ Discovery of unanswered questions about subjects, concepts or problems.

❖ Identification of relevant theoretical or conceptual framework for research problem.

❖ Identification or development of new or refined clinical interventions to test through empirical research.

❖ Development of hypothesis to be tested in a research study.

❖ Help in planning the methodology of the present research study.

❖ Help in the development of research instruments.

❖ Identification of suitable design and data collection methods for a research study.

❖ Assistance in interpreting study findings and in developing implications and recommendations

❖ Description of the strengths and weakness of designs or methods of inquiry and instruments used in earlier research work.

❖ Determination of a need to replicate a prior study in different study settings or different sample or sizes or different study population

TYPES OF REVIEW OF LITERATURE

The literature review may be carried out for different purposes using different methodologies. Therefore, on the basis of purposes and methodologies, literature review would be broadly classified into following categories;

❖ **Traditional or narrative literature review;** -This type of literature review presents the summary of literature and draws conclusions about the topic in question. In this the body of literature is composed of a summary of facts on the subject area from primary and secondary sources.

❖ **Systematic literature review:-** The systematic literature review is significantly from the traditional or narrative literature review, which include a more systematic and rigorous approach to literature review in a specific subject area.

- ❖ **Meta- analysis;-** Meta analysis is an advanced form of systematic literature review , which includes a large body of findings from quantitative studies and computes the statistical analysis in order to draw the integrated and cumulative inferences and conclusion.
- ❖ **Meta–synthesis;-**Contrary to Meta-analysis,Meta – synthesis is a non-statistical technique used to integrate, evaluate and interpret the findings of multiple qualitative researches studies. Finding from phenomenological grounded theory or ethnographic studies may be integrated and uses

UNIT IV
SAMPLING

INTRODUCTION: - Sampling is a process of selecting representative units from an entire population of a study. It is not a new development, but in recent times it is used by people in all fields even in day by day life to get an understanding about societies, opinions or situations.

Similarly in research studies, it is not always possible to study an entire population; therefore the researcher draws a representative part of a population through sampling process.

DEFINITION: - "The process of selecting a number of individuals for a study in such a way that the individuals represent the larger group from which they were selected "

"Sampling is the process of selecting a representative segment of the population under study"

"Sampling is the process of selecting observation (a sampling) to provide an adequate description and inferences of the population"

SAMPLING PROCESS

Sampling is a process of selecting a part of the assigned population to represent the entire population. The procedure of sampling should be systematically organized.

- **Identifying and define the target population;** the first steps of the sampling sampling process is the identification and define the target population
- **Describe the accessible population and ensuring sampling frame**; it is not always possible to have access of each subject included in the target population.
- **Specify the sampling unit;**next the researcher must establish the specific inclusion and exclusion criteria to select a particular sampling unit.
- **Specifying sample selection methods:** it is one important stages of the sampling process where the researcher decide whether sample will be drawn from the population by using probability or non-probability sampling techniques.
- **Determining the sample size;** it is very essential to determine the size of sample, so that the research can plan the implementation of the sampling process accordingly
- **Specifying sampling plan;** before the selection of a particular sample, the researcher must have a final sampling plan, so that sampling process can be implemented without any undue problems.
- **Selecting desired sample:** A researcher draws representative's sample from the accessible population which requires the implementation of the plan of the sampling process.

SAMPLING TECHNIQUES

Sampling is the process of selecting a representative part of the population carefully carried out sampling process helps to draw a sample that represents the characteristics of the population from which the sample is drawn. There are various types of sampling techniques. Basically they are

Types of sampling technique

Probability sampling	**Non-Probability sampling**
• **Sampling random sampling** • **Stratified random sampling** • **Systematic random sampling** • **Cluster\ multistage sampling**	• **Purposive sampling** • **Convenience sampling** • **Consecutive sampling** • **Quota sampling** • **Snowball sampling** • **Volunteer sampling** • **Genealogy sampling**

Probability sampling technique:- It is based on the theory pf probability .it involve random selection of the element /members of the population. Every subject in a population has equal chance to be selected as study sample. In probability sampling techniques the chances of systematic bias are relatively less because subjects are randomly selected.

Simple random sampling: - Every member of population has an equal chance of being selected as subject

- The lottery method
- The use of table of random numbers
- The use of computer
- Population should be homogeneous.
- Must have list of the element/members of the accessible   population
- Random selection either by lottery random table or computer

Stratified random sampling: -dividing heterogeneous population in strata based on selected traits such as age gender, habits and the random selection of sample from each stratum.

- Proportionate stratified random sampling
- Disproportionate stratified random sampling
- Used for heterogeneous population
- Division of heterogeneous population in strata based on selected taints such as agegender region socio economic status, diagnosis education geographical regionetc.

Systematic random sampling: - selecting of every kth case from the group such as every ten person on a patient list pr every hundred person. It can be likened to an arithmetic progression wherein the difference between any two consecutive numbers is the same. The desired sample size is establish at some number (n) and the size of population must be known or estimated (N)

K=N /nor K = Number of subjects in target population (N)

Size of sample (n)

- List of target population must be available
- Random distribution subject rather than segregation

- The first subject number is chosen by the help of random   number table

Cluster or multistage sampling:-In very large population random selection of geographic cluster and then random selection of subjects from these clusters.
- When population is very large such as in Asia random selection of geographic clusters
- Random selection of subject from selection of subjects from selected clusters

Sequential sampling: - The investigator initially selects small sample and tries to male inferences if not able to draw results he and she adds subjects until clear cut inferences can be drawn. This method of sample selection is slightly different from other methods.
- Sample size is not fixed continue till inferences are drawn.

Non probability sampling:-non probability sampling is a technique wherein the samples are gathered in a process that does not give all the individuals in the population equal chances of being selected in the sample. It is generally observed that despite the limitation of non-probability sampling most of the nurse researcher's use these sampling techniques and true random sampling techniques are less frequently used these sampling techniques and true random sampling techniques are less frequently used in nursing research studies.

Purposive sampling: - subjects are chosen to   be a part of the sample with a specific purpose in mind.
- Requires in depth knowledge about the accessible population
- Used when limited number of individuals possess the trait of interest

Convenience sampling: - subjects are selected because of their convenient accessibility and proximity to the researcher.
- Convenient accessibility and proximity to study subjects
- In case of limited availability of time and resources.

Volunteer sampling: -target subjects are informed through mass media to participate in study and interested participants may voluntarily contact researcher to participate in the study.
Target subjects are informed through mass media
Interested participants themselves contact researcher and volunteer to participate in the study

Consecutive sampling:-picks up all the available subjects who are meeting the preset inclusion and exclusion criteria
Used for continuously changing population such as hospital patients.

Quota sampling: - equal or proportionate representation of subjects from each quota
The bases of the quota are usually age gender education race religion socioeconomic status etc.

Snowball sampling: - locating the initial subject and then taking to identify people with a similar trait of interest
Used by researcher to identify potential subjects in studies where subjects are hard to locate

Genealogy sampling: -a participant is identified and then he and she is asked to refer his or her relative families to participate in study irrespective of their location of stay
- Used in rural population which is socioculturally and economically homogenous? Also used in genetic studies to identify trends of genes in traditional families

UNIT VII
DESCRIPTIVE STATISTICS

DEFINITION

Statistics is the science of making effective use of numerical data which is related to collection, analysis and interpretation of data.
Statistics is the study of how to collect, organizes, analyze, and Interpret data.

IMPORTANCE

➢ Statistics plays a vitally important role in the research.

➢ It helps to answer important research questions and field in study.

➢ Helps you understand how to apply statistical method

➢ Important to understand what tools are suitable for a particular research study.

➢ Statistics enables to understand specified statistical concepts and procedures.

TYPES OF STATISTICS

There are two approaches to the statistical analysis of data

1. Descriptive Statistics: - Descriptive statistics are techniques which help the investigator to organize, summarize and describe measures of a sample.2. Inferential statistics:-The inferential approach helps to decide whether the outcome of the study is a result of factors planned within design of the study or determined by chance.

Normal Distribution and Measures of Relationship

The normal distribution, also known as the Gaussian distribution, is the most important probability distribution in statistics for independent, random variables. Most people recognize its familiar bell-shaped curve in statistical reports.

The normal distribution is a continuous probability distribution that is symmetrical around its mean, most of the observations cluster around the central peak, and the probabilities for values further away from the mean taper off equally in both directions. Extreme values in both tails of the distribution are similarly unlikely. While the normal distribution is symmetrical, not all symmetrical distributions are normal. For example, the Student's t, Cauchy, and logistic distributions are symmetric.

As with any probability distribution, the normal distribution describes how the values of a variable are distributed. It is the most important probability distribution in statistics because it accurately describes the distribution of values for many natural phenomena. Characteristics that are the sum of many independent processes frequently follow normal distributions. For example, heights, blood pressure, measurement error, and IQ scores follow the normal distribution.In this blog post, learn how to use the normal distribution, about its parameters, the Empirical Rule, and how to calculate Z-scores to standardize your data and find probabilities. Example of Normally Distributed Data: Heights

Heights of 14 Year Old Girls
Normal, Mean=1.512, StDev=0.0741
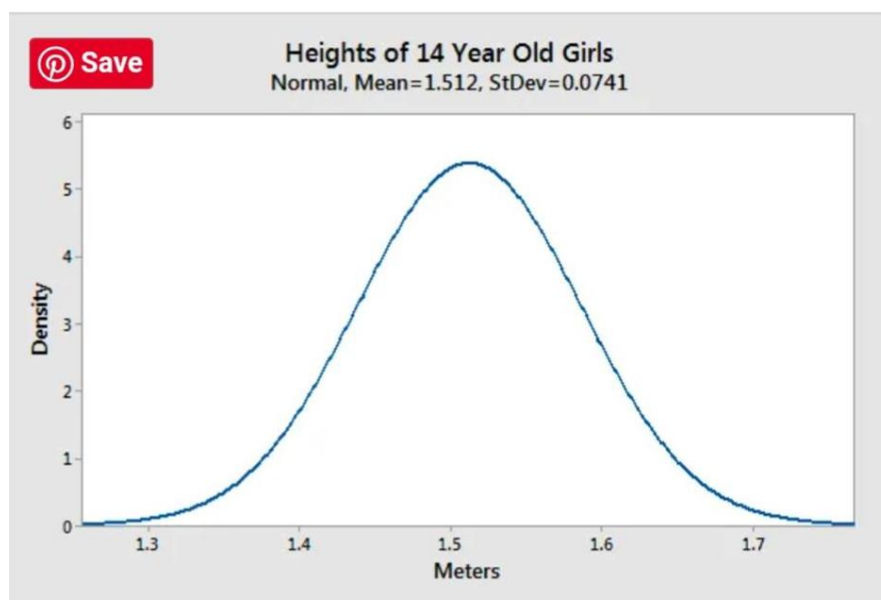
Height data are normally distributed. The distribution in this example fits real data that I collected from 14-year-old girls during a study.

As you can see, the distribution of heights follows the typical bell curve pattern for all normal distributions. Most girls are close to the average (1.512 meters). Small differences between an individual's height and the mean occur more frequently than substantial deviations from the mean. The standard deviation is 0.0741m, which indicates the typical distance that individual girls tend to fall from mean height.
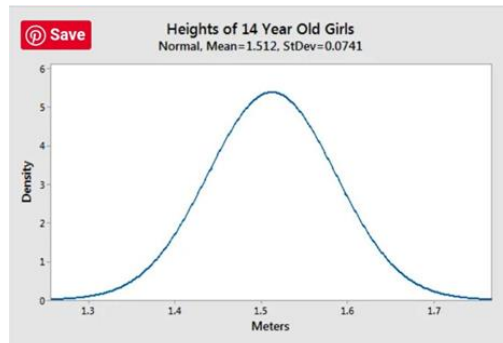
The distribution is symmetric. The number of girls shorter than average equals the number of girls taller than average. In both tails of the distribution, extremely short girls occur as infrequently as extremely tall girls.

Parameters of the Normal Distribution

As with any probability distribution, the parameters for the normal distribution define its shape and probabilities entirely. The normal distribution has two parameters, the mean and standard deviation. The Gaussian distribution does not have just one form. Instead, the shape changes based on the parameter values, as shown in the graphs below.
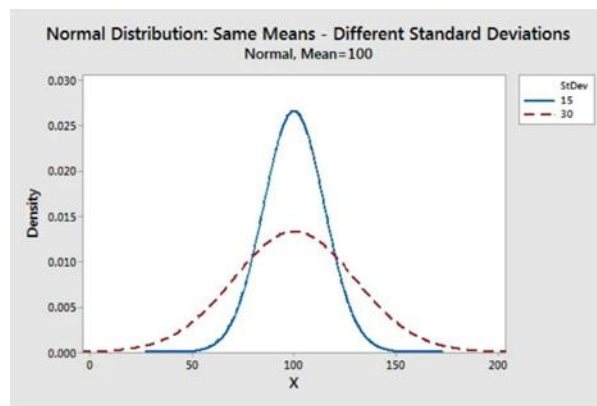
Mean

The mean is the central tendency of the normal distribution. It defines the location of the peak for the bell curve. Most values cluster around the mean. On a graph, changing the mean shifts the entire curve left or right on the X-axis.
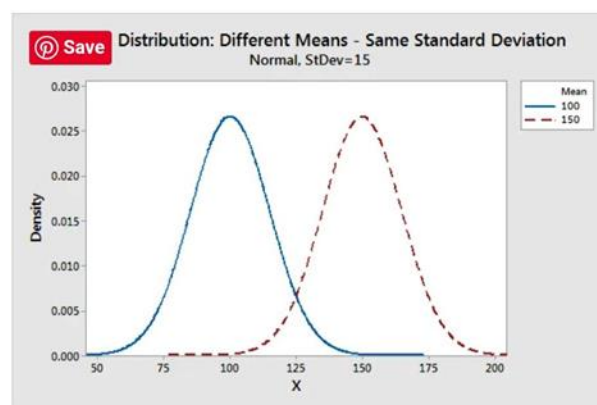
Standard deviation

The standard deviation is a measure of variability. It defines the width of the normal distribution. The standard deviation determines how far away from the mean the values tend to fall. It represents the typical distance between the observations and the average.

On a graph, changing the standard deviation either tightens or spreads out the width of the distribution along the X-axis. Larger standard deviations produce

Normal Distribution: Same Means - Different Standard Deviations

Population parameters versus sample estimates

The mean and standard deviation are parameter values that apply to entire populations. For the Gaussian distribution, statisticians signify the parameters by using the Greek symbol μ (mu) for the population mean and σ (sigma) for the population standard deviation.

Unfortunately, population parameters are usually unknown because it's generally impossible to measure an entire population. However, you can use random samples to calculate estimates of these parameters. Statisticians represent sample estimates of these parameters using $\bar{x}$ for the sample mean and s for the sample standard deviation.

Common Properties for All Forms of the Normal Distribution

Despite the different shapes, all forms of the normal distribution have the following characteristic properties.

- They're all symmetric bell curves. The Gaussian distribution cannot model skewed distributions.
- The mean, median, and mode are all equal.
- Half of the population is less than the mean and half is greater than the mean.
- The Empirical Rule allows you to determine the proportion of values that fall within certain distances from the mean. More on this below!

While the normal distribution is essential in statistics, it is just one of many probability distributions, and it does not fit all populations.

The Empirical Rule for the Normal Distribution

When you have normally distributed data, the standard deviation becomes particularly valuable. You can use it to determine the proportion of the values that fall within a specified number of standard deviations from the mean. For example, in a normal distribution, 68% of the observations fall within +/- 1 standard deviation from the mean. This property is part of the Empirical Rule, which describes the percentage of the data that fall within specific numbers of standard deviations from the mean for bell-shaped curves.

Mean +/- standard deviations	Percentage of data contained
1	68%
2	95%
3	99.7%

Let's look at a pizza delivery example. Assume that a pizza restaurant has a mean delivery time of 30 minutes and a standard deviation of 5 minutes. Using the Empirical Rule, we can determine that 68% of the delivery times are between 25-35 minutes (30 +/- 5), 95% are between 20-40 minutes (30 +/- 2*5), and 99.7% are between 15-45 minutes30 +/-3*5). The chart below illustrates this property graphically
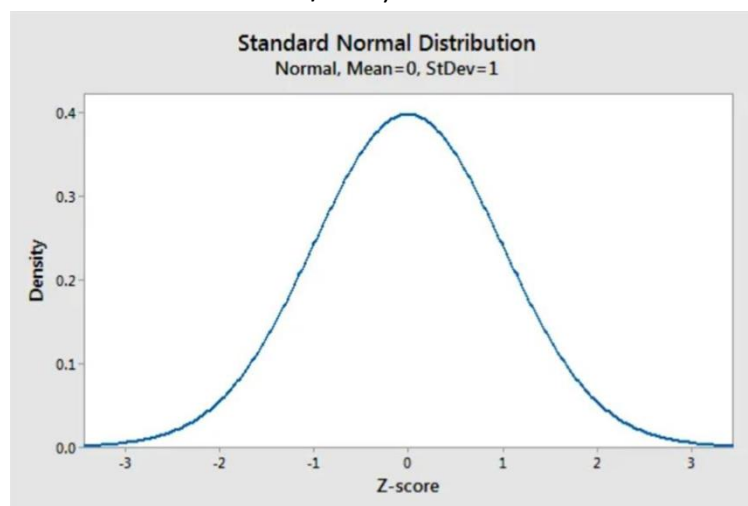

If your data do not follow the Gaussian distribution and you want an easy method to determine proportions for various standard deviations, use Chebyshev's Theorem! That method provides a similar type of result as the Empirical Rule but for non-normal data.

To learn more about this rule, read my post, Empirical Rule: Definition, Formula, and Uses.

Standard Normal Distribution and Standard Scores

As we've seen above, the normal distribution has many different shapes depending on the parameter values. However, the standard normal distribution is a special case of the normal distribution where the mean is zero and the standard deviation is 1. This distribution is also known as the Z-distribution.

A value on the standard normal distribution is known as a standard score or a Z-score. A standard score represents the number of standard deviations above or below the mean that a specific observation falls. For example, a standard score of 1.5 indicates that the observation is 1.5 standard deviations above the mean. On the other hand, a negative score represents a value below the average. The mean has a Z-score of 0.
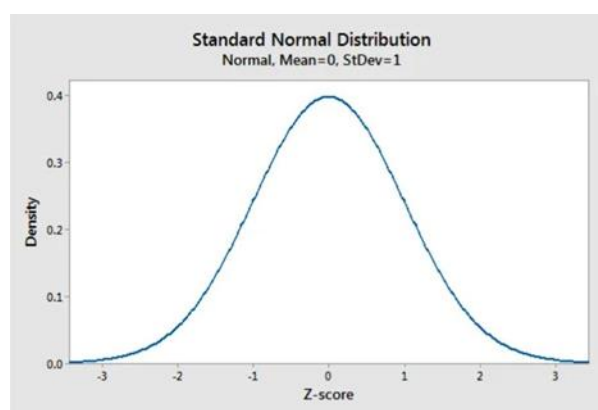
Suppose you weigh an apple and it weighs 110 grams. There's no way to tell from the weight alone how this apple compares to other apples. However, as you'll see, after you calculate its Z-score, you know where it falls relative to other apples.

Standardization: How to Calculate Z-scores

Standard scores are a great way to understand where a specific observation falls relative to the entire normal distribution. They also allow you to take observations drawn from normally distributed populations that have different means and standard deviations and place them on a standard scale. This standard scale enables you to compare observations that would otherwise be difficult.

This process is called standardization, and it allows you to compare observations and calculate probabilities across different populations. In other words, it permits you to compare apples to oranges. Isn't statistics great!

To standardize your data, you need to convert the raw measurements into Z-scores.

To calculate the standard score for an observation, take the raw measurement, subtract the mean, and divide by the standard deviation. Mathematically, the formula for that process is the following:

$$Z+ = ++\frac{+}{+X + - +\mu}\sigma$$

X represents the raw value of the measurement of interest. Mu and sigma represent the parameters for the population from which the observation was drawn.

After you standardize your data, you can place them within the standard normal distribution. In this manner, standardization allows you to compare different types of observations based on where each observation falls within its own distribution.

Example of Using Standard Scores to Make an Apples to Oranges Comparison

Suppose we literally want to compare apples to oranges. Specifically, let's compare their weights. Imagine that we have an apple that weighs 110 grams and an orange that weighs 100 grams.

If we compare the raw values, it's easy to see that the apple weighs more than the orange. However, let's compare their standard scores. To do this, we'll need to know the properties of the weight distributions for apples and oranges. Assume that the weights of apples and oranges follow a normal distribution with the following parameter values:

	Apples	Oranges
Mean weight grams	100	140
Standard Deviation	15	25

Now we'll calculate the Z-scores:

- Apple = (110-100) / 15 = 0.667
- Orange = (100-140) / 25 = -1.6

The Z-score for the apple (0.667) is positive, which means that our apple weighs more than the average apple. It's not an extreme value by any means, but it is above average. for apples.
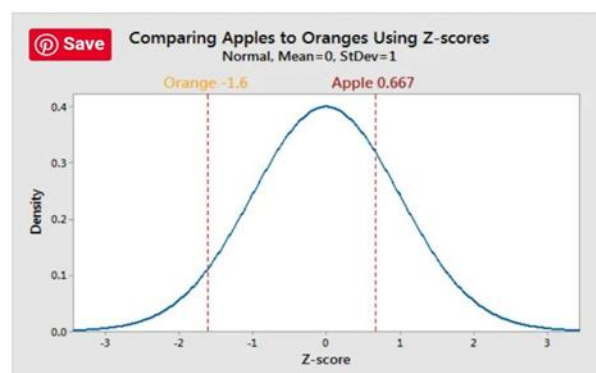
On the other hand, the orange has fairly negative Z-score (-1.6). It's pretty far below the mean weight for oranges. I've placed these Z-values in the standard normal distribution below.

While our apple weighs more than our orange, we are comparing a somewhat heavier than average apple to a downright puny orange! Using Z-scores, we've learned how each fruit fits within its own bell curve and how they compare to each other.

For more detail about z-scores, read my post, Z-score: Definition, Formula, and Uses

Finding Areas under the Curve of a Normal Distribution

The normal distribution is a probability distribution. As with any probability distribution, the proportion of the area that falls under the curve between two points on a probability distribution plot indicates the probability that a value will fall within that interval. To learn more about this property, read my post about Understanding Probability Distributions.
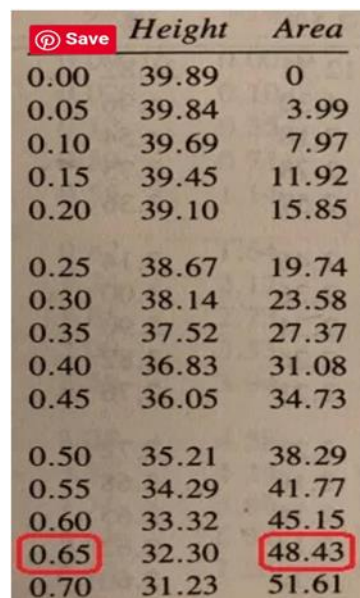
Typically, I use statistical software to find areas under the curve. However, when you're working with the normal distribution and convert values to standard scores, you can calculate areas by looking up Z-scores in a Standard Normal Distribution Table.

Because there are an infinite number of different Gaussian distributions, publishers can't print a table for each distribution. However, you can transform the values from any normal distribution into Z-scores, and then use a table of standard scores to calculate probabilities.

Using a Table of Z-scores

Let's take the Z-score for our apple (0.667) and use it to determine its weight percentile. A percentile is the proportion of a population that falls below a specific value. Consequently to determine the percentile, we need to find the area that corresponds to the range of Z-scores that are less than 0.667. In the portion of the table below, the closest Z-score to ours is 0.65, which we'll use.

The trick with these tables is to use the values in conjunction with the properties of the bell curve to calculate the probability that you need. The table value indicates that the area of

	Height	Area
0.00	39.89	0
0.05	39.84	3.99
0.10	39.69	7.97
0.15	39.45	11.92
0.20	39.10	15.85
0.25	38.67	19.74
0.30	38.14	23.58
0.35	37.52	27.37
0.40	36.83	31.08
0.45	36.05	34.73
0.50	35.21	38.29
0.55	34.29	41.77
0.60	33.32	45.15
0.65	32.30	48.43
0.70	31.23	51.61

The trick with these tables is to use the values in conjunction with the properties of the bell curve to calculate the probability that you need. The table value indicates that the area of the curve between -0.65 and +0.65 is 48.43%. However, that's not what we want to know. We want the area that is less than a Z-score of 0.65.

We know that the two halves of the normal distribution are mirror images of each other. So, if the area for the interval from -0.65 and +0.65 is 48.43%, then the range from 0 to +0.65 must be half of that:

48.43/2 = 24.215%. Additionally, we know that the area for all scores less than zero is half (50%) of the distribution.

Therefore, the area for all scores up to 0.65 = 50% + 24.215% = 74.215%

Our apple is at approximately the 74th percentile.
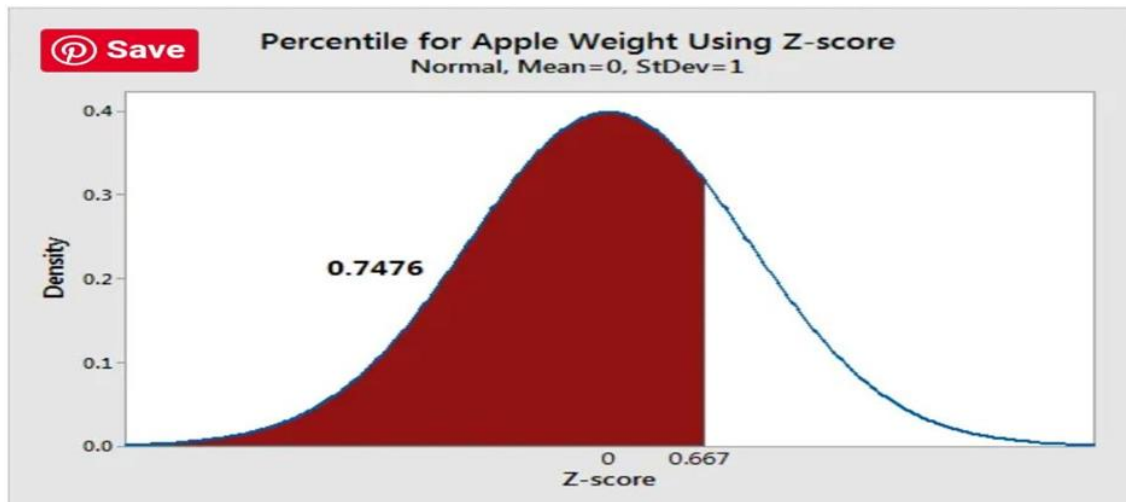
Below is a probability distribution plot produced by statistical software that shows the same percentile along with a graphical representation of the corresponding area under the bell curve. The value is slightly different because we used a Z-score of 0.65 from the table while the software uses the more precise value of 0.667.

Other Reasons Why the Normal Distribution is Important

In addition to all of the above, there are several other reasons why the normal distribution is crucial in statistics.

- Some statistical hypothesis tests assume that the data follow a bell curve. However, as I explain in my post about parametric and nonparametric tests, there's more to it than only whether the data are normally distributed.

- Linear and nonlinear regression both assumes that the residuals follow a Gaussian distribution. Learn more in my post about assessing residual plots.

- The central limit theorem states that as the sample size increases, the sampling distribution of the mean follows a normal distribution even when the underlying distribution of the original variable is non-normal.

MEASURES OF RELATIONSHIP

- The Mean, Median, Mode Range and Standard Deviation are univariate as it describes only one variable at a time.

- Description for two variables is done in terms of relationship.

- The most common vicariate descriptive statistics include cross tab tables, correlation and regression.

- The cross tab table is same as contingency table.

Concept of Probability

- A probability is a number that reflects the chance or likelihood that a particular event will occur. Probabilities can be expressed as proportions that range from 0 to 1, and they can also be expressed as percentages ranging from 0% to 100%.

- A probability of 0 indicates that there is no chance that a particular event will occur, whereas a probability of 1 indicates that an event is certain to occur.

- A probability of 0.45 (45%) indicates that there are 45 chances out of 100 of the event occurring.

- The concept of probability can be illustrated in the context of a study of obesity in children 5-10 years of age who are seeking medical care at a particular pediatric practice.
- The population (sampling frame) includes all children who were seen in the practice in the past 12 months and is summarized in the table.

| | Age (years) | | | | | |
	5	6	7	8	9	10	Total
Boys	432	379	501	410	420	418	2,560
Girls	408	513	412	436	461	500	2,730
Total	840	892	913	846	881	918	5,290

Unconditional Probability: A randomly selected child will have the equal probability of other children and it is 1/N, where N=the population size. Thus, the probability that any child is selected is 1/5,290 = 0.0002.

| | Age (years) | | | | | | |
	5	6	7	8	9	10	Total
Boys	432	379	501	410	420	418	2,560
Girls	408	513	412	436	461	500	2,730
Total	840	892	913	846	881	918	5,290

Conditional Probability: A purposeful selection of a population subset such as probability of 9 year old girls. This can be computed by the formula 461/2730 = 0.169 (16.9%)

Normal Probability Curve (Z score) Properties

- It is also called as normal distribution.
- It is based on the area/distribution of data.
- It is a bell shaped curve.
- Its center point is equal in Mean = Median = Mode. (X=M=Z)
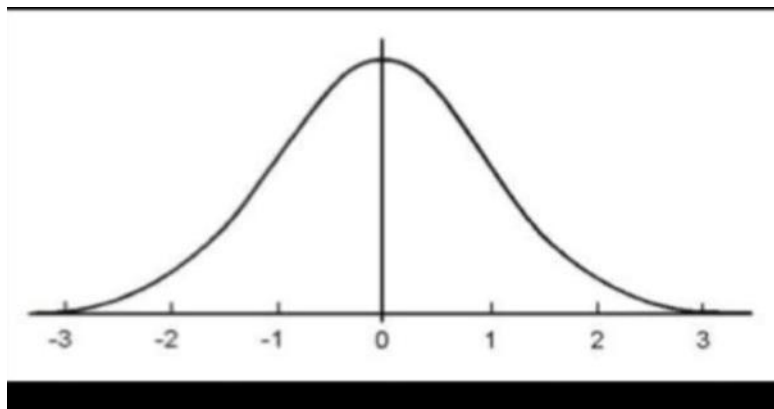
Normal Probability Curve (Z score) Properties

$$y = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$$

$\mu =$ Mean
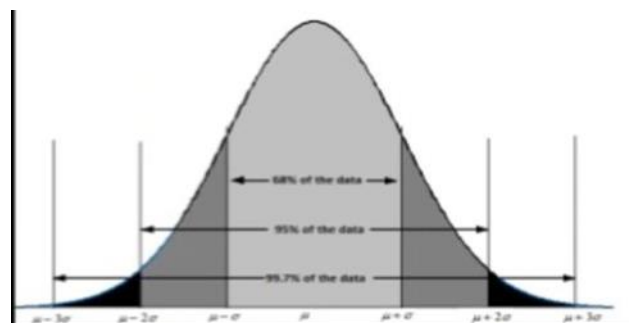$\sigma =$ Standard Deviation
$\pi \approx 3.14159\cdots$
$e \approx 2.71828\cdots$

When the Mean, Median and Mode are equal at the center of the curve it is denoted as "μ" (mu). The line of the cure is extended to infinity at left side as well as right side.

- Total area of the normal curve is taken as "1"
- 1 is indicative of the maximum probability.
- Probability is the measure of the likelihood that an event will occur in a Random Experiment.
- Probability is quantified as a number between 0 and 1, where, loosely speaking, 0 indicates impossibility and 1 indicates certainty. It is also called Gaussian or normal curve.
- The shape of the curve depends on mean and SD.
- If SD is high then width increases and vice versa and height decreases.
- When the mean is 0 and SD is 1 curve is said to be standard normal curve.
- The normal distribution is calculated normal probability model

Distributions that are normal or Gaussian have the following characteristics:

- Approximately 68% (68.27%) of the values fall between the mean and one standard deviation (in either direction)
- Approximately 95% (95.45%) of the values fall between the mean and two standard deviations (in either direction)
- Approximately 99.9% (99.73%) of the values fall between the mean and three standard deviations (in either direction)
- If we have a normally distributed variable and know the population mean (μ) and the standard deviation (σ), then we can compute the probability of particular values based on this equation for the normal probability model.

Normal Probability Curve (Z score) Example

- Consider body mass index (BMI) in a population of 60 year old males in whom BMI is normally distributed and has a mean value = 29 and a standard deviation = 6. The standard deviation gives us a measure of how spread out the observations are.
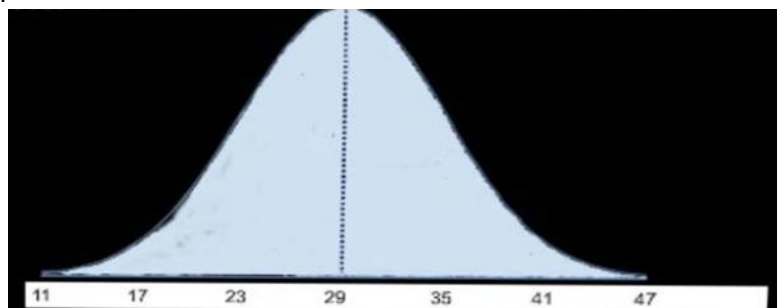
- The mean (μ = 29) is in the center of the distribution, and the horizontal axis is scaled in increments of the standard deviation (σ = 6) and the distribution essentially ranges from μ - 3 σ to μ + 3σ.
- It is possible to have BMI values below 11 or above 47, but extreme values occur very infrequently.
- To compute probabilities from normal distributions, we will compute areas under the curve.
- The total area under the curve is 1.

- Here the mean is equal to median, so half (50%) of the area under the curve is above the mean and half is below, so Pr(BMI < 29)=0.50.
- Consequently, if we select a man
- What is the probability that a 60 year old male has BMI less than 35?
- The probability is displayed graphically and represented by the area under the curve to the left of the value 35 in the figure below.
- Note that BMI = 35 is 1 standard deviation above the mean.
- For the normal distribution we know that approximately 68% of the area under the curve lies between the mean plus or minus one standard deviation.

  Therefore, 68% of the area under the curve lies between 23 and 35. We also know that the normal distribution is symmetric about the mean, therefore P (29 < X < 35) = P(23 < X < 29) = 0.34. Consequently, P(X <35) = 0.5 + 0.34 = 0.84 or 84%. This can also be calculated using the formula $Z = X - \mu / \sigma$. where μ is the mean and σ is the standard deviation of the variable X. In order to compute P(X < 30) we convert the X=30 to its corresponding Z score .Z= 30-29/6 = 1/6 = 0.17 (refer the Z table for corresponding value i.e 0.0675) = 0.0675 + 0.5 = 0.5675 = 56.75% Z-table (Right of Curve or Left) - Statistics How To.pdf
- The mean height of 500 students is 165 cm and the SD is 6. Assuming that heights are normally distributed. Find how many students will have height between 155 and 175cm. $(Z = X - \mu / \sigma.)$ • Z = 155-165/6 = -10/6 = -1.67 • Z = 175 -165/6 = 10/6 = 1.67 • Area under the standard normal curve is between Z = -1.67 and 1.67. • = (area between Z = -1.67 and 0) + area between Z = 0 and 1.67. • = (0.9525 – 0.5 = 0.4525) + (0.4525) = 0.9050 = 90.5% (0.9050x500 = 452.5 = 452) students are having height between 155cm to 175cm.

Importance of Normal Probability Curve

- Data obtained from biological measurements approximately follow normal distribution.
- Binominal and Poisson distribution can be approximated to normal distribution.
- Binominal is a fixed trial with limited probability. It can have only two results. (Tossing coin)
- Poisson is infinite trial with multiple outcome of results. (Printing mistakes of a book)
- In case of large samples it can be used to study the descriptive statistics such as mean, SD etc. Used to find confidence limits of the population parameters.
- It is the basis of test of significance.

UNIT VIII
Correlation

- The Mean, Median, Mode Range and Standard Deviation are univariate as it describes only one variable at a time.
- Description for two variables is done in terms of relationship.
- The most common vicariate descriptive statistics include cross tab tables, correlation and regression.
- The cross tab table is same as contingency table.

Correlation Coefficient

- The relationship between two quantitative variables is called correlation.
- The extent/degree /intensity of relationship between two variables is expressed in terms of correlation coefficient that ranges from -1 to 1.
- It shows only the relation of variables not the influence or cause and effect relationships.

Types of Correlation Coefficient

• Based on the direction of changes; -

a)   Perfect Positive Correlation: X is directly proportional to Y. Both rise and fall in same proportion. Eg. Designation & Salary. r = 1.

b)   Perfect Negative Correlation: X and Y are inversely proportionate. r= -1. Eg. Insulin and blood sugar.

c)   Moderately Positive Correlation: A type of positive correlation.

d)   Moderately Negative Correlation. A type of negative correlation.

e)   No Correlation. No relation. r = 0. Smoking and type of housing.

• Based on number of variables;

A.   Simple: Only two variables.

B.   Multiple: More than two variables.

C.   Partial: More than two variables but correlation is studies for only two variables by keeping the third variable as constant. E.g. X= yield, y = fertilizer, z = amount of rainfall. Simple = r(xy), r(yz), r(xz) Multiple= r(xyz) Partial = r(xy)z

• Based on Linearity;

A)   **Linear:** If the changes in one variable bears a constant amount of change or solid pattern of change in

Linear Correlation
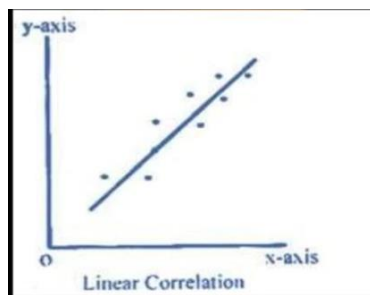
B) Another variable then the correlation is said to be linear.

B) **Non Linear:** Correlation is said to be nonlinear if the ratio of change is not constant. In other words, when all the points on the scatter diagram tend to lie near a smooth curve, the correlation is said to be nonlinear (curvilinear).

Non Linear Correlation
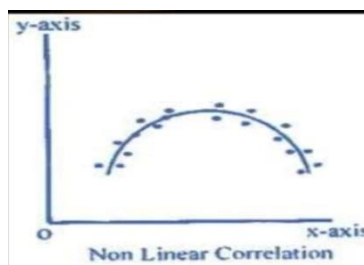
Methods of Correlation Coefficient

•   Karl Pearson's method of correlation

•   Spearman's rank correlation.

•   Scatter Plot/graph/scatter diagram method.

Karl Pearson's method of correlation

•   The Karl Pearson's product-moment correlation coefficient (or simply, the Pearson's correlation coefficient) is a measure of the strength of a linear association between two variables and is denoted by r or rxy(x and y being the two variables involved).

•   It attempts to draw a line of best fit through the data of two variables, and the value of the Pearson correlation coefficient, r, indicates how far away all these data points are to this line of best fit.

- It does not consider whether the variable is dependent or independent variable. It treats all variables equally.

Properties of Pearson's method

- R is unit-less. Thus, we may use it to compare association between totally different bivariate distributions as well.
- The value of r always lies between +1 and - 1. Depending on its exact value, we see the following degrees of association between the variables.
- A value greater than 0 indicates a positive association i.e. as the value of one variable increases, so does the value of the other variable.
- A value less than 0 indicates a negative association i.e. as the value of one variable increases, the value of the other variable decreases.

Interpretation of Pearson's method

Strength of Association	Negative r	Positive r
Weak	-0.1 to -0.3	0.1 to 0.3
Average	-0.3 to -0.5	0.3 to 0.5
Strong	-0.5 to -1	0.5 to 1
Perfect	-1	+1

The coefficient of correlation is "zero" when the variables X and Y are independent.

Assumptions of Pearson's method

- The relationship between the variables is "Linear", which means when the two variables are plotted, a straight line is formed by the points plotted.
- The variables are independent of each other.
- The coefficient of correlation measures not only the magnitude of correlation but also tells the direction. Such as, r = -0.67, which shows correlation is negative because the sign is "-"and the magnitude is 0.67.

Karl Pearson's method of correlation

- It can be calculated using the formula • In case of grouped data "x" and "y" can be taken as the mid value of the class interval.

$$r = \frac{\Sigma(X-\bar{X})(Y-\bar{Y})}{\sqrt{\Sigma(X-\bar{X})^2}\sqrt{(Y-\bar{Y})^2}}$$

Where, $\bar{X}$ = mean of X variable

$\bar{Y}$ = mean of Y variable

Pearson's method • Compute the correlation coefficient from the following data; •

Weight in Kg	60	70	80	90
Cholesterol	120	130	140	150

Assumptions of Pearson's method

Pearson's method

Merits and Demerits of Pearson's method

Merits;

- It summarizes the correlation and if plotted on a graph with a linear line then it shows the direction too.

Demerits:

- The correlation coefficient always assumes linear relationship regardless of the fact that assumption is correct or not.
- The value of the coefficient is unduly affected by the extreme values
- It cannot be used for ordinal data
- It is time consuming

UNIT X

INTRODUCTION -: Computers influence every sphere of human activity and bring in many changes in industry, education, health care, scientific research, social service, law and even in arts, music and painting.

- The computer revolutionized the nursing profession. Clinical and technological advancements led to a nursing specialty called nursing informatics the application of computer and information science to promote and support the practice of nursing and the delivery of nursing care.

HISTORICAL PERSPECTIVES OFCOMPUTERS AND NURSING -: In 1960's, use of computers in healthcare is questioned, but studies on computers in nursing are started. 1970's, nurses assisted in the design of HIS. Computers are used in financial and management functions, and several communities developed management information system.

- In 1980's, nursing Informatics is formally accepted as new nursing specialty
- In 1990's, computer technology became an integral part of the healthcare setting.
  In the year 2000, Clinical Information System became individualized in the electronic patient record, mobile computing device were introduced.

COMPUTER-: IT MEANING

- **C- Commonly**
- **O- Operator**
- **M- Machine**
- **P- Particular**

- **U-Used for**
- **T-Training**
- **E-Education**
- **R- Research**

USES OF COMPUTER IN NURSING

Admission, Discharge and Transfer (ADT) -: ADT system allows nurses to obtain basic biographical information on clients before they arrive to the unit. When a discharge or transfer is entered in the computer, all the appropriate departments are automatically notified, thus saves many phone calls, information about beds and clients location on the unit is also readily available.

Nursing documentation -: Nursing assessments, clients care plan, medication administration records, nursing notes and discharge plans are some of the forms of nursing administration that are computerized. Advantage of this documentation is legible and it can store standard nursing care plans in a format determined by the institutions, to be used by the nurses as the basis for developing individualized client care plan.

TEACHING LEARNING PROCESS:

- Instructing the students using PowerPoint slides, word documents or web pages and using hyperlinks for better concept daily.
- Readymade software could give practice material to students.
- Collecting notes from web pages for detailed information and projects/ assignments.
- Saving the documents as soft copy for future use.
- Learning through animations, as they are much near to the students.
- E-books/online libraries/online encyclopedia helps to guide in minutes and saves precious time and resources.
- Publications of pamphlets brochures for awareness with institutions and among community members.

REAL LIFE USES OF COMPUTER IN EDUCATION:

- Testing and Evaluation Process:
- Keeping records of students for their academic scores.
- Keeping records in relation to   personal history.
- Creating question bank for students.
- Online testing and evaluation.
- Analysis and interpretation of the data.
- Guidance purposes:
- Testing for aptitude, interest, psychology using computers data bases and interest.

Library:

- Documents stored as soft copy for students/ faculty members use.
- Online magazines, journals, brochures, research articles.
- Records of the books, record of the books maintained using special library software.
- Records of the issues and returns of the books.

School Administration:

- Records of students (personal/academic)
- Records of employee of school.
- Accounts of the institutions.
- Aid to memory with minimum paper work.
- Circulation of instructions/notices and getting it in printed form.

NURSING SOFTWARES:

Probably the most overlooked and underappreciated resource in the operating room which nursing professionals require is nursing that performs multiple services. It minimizes non- clinical time, improves time management and facilitates access to information allowing them to do the job they were trained to do that is deliver patient care.

SIS nursing software includes a series of modules that address each nursing related phases of the surgery case and more. It includes,

- Pre-admission testing
- Pre-operative
- Intra-operative
- Post-operative

Tech Breakthroughs that will make you a Better Nurse:

Better communication systems- Some hospitals are incorporating advanced Communication Systems, in which nurses and other members of the health care team can text message, speak, and receive patient alarms through their smart phone devices using specialized apps. This concept replaces antiquated paging systems, and helps the whole nursing unit stay in touch and work more efficiently with each other.

Electronic Healthcare Records (EHR)- Soon, the days of endless paperwork, filling out patient charts, and having doctors fax over medical records will be gone for good as more and more hospitals and facilities convert to EHR, which allows healthcare providers to access patient information with a few keystrokes. With an extensive patient history easily accessible and all in one place, it cuts down on human error, alerts nursing staff to possible drug interactions, and keeps track of diagnostic test results.

Better diagnostic tools-: It makes everyone's life easier – both RNs and patients – when diagnostic exams can be performed non- invasively. Thanks to new technologies, there are more options available now to perform minimally invasive tests and treatments. This helps lower risk of infection, and over time, is more cost effective. Some examples include nanotechnology like handheld biosensors that can detect a range of diseases from miniscule body specimens. Another example is Texas Children's Hospital's use of ultrasound technology to place peripheral IV (PIV).

Tech-driven drug delivery-: Many hospitals are implementing drug delivery systems in the

In the form of implantable devices that release medication into patients. These aids RNs since they can schedule complex dosing to ensure patients get the medications they need in the right amounts and at exactly the right moment. Not only does this reduce human error, but it allows nurses to focus on other aspects of patient care.

Patient lifting technology -: Here's a scary stat, but one that if you're an RN, will probably not surprise you: records showed that more than 2,400 of its nursing staff suffer debilitating injuries every year from lifting patients "the safe patient handling program," says the article. While many hospitals have such technology in various units, VA hospitals are trying to make the technology the norm for every patient room. Since the implementation of the program in the VA hospitals, they report a 40 percent reduction in nursing injuries from moving patients.

INRODUCTIO TO WORD PROCESSING

"This presentation will tell you about the basic theory of word processing or Microsoft word. its feature pros and cons and evaluation over time"

MEANING OF WORD PROCESSING

- It is also known as a document preparation System.
- It is a programme where you can type and print documents
- It has replaced the old typewriters Then Now

Application areas of word processing:

- Business– Legal Copies, Letterheads, Letters, Memos, Circulars etc.
- Education – To develop word processing skills from the very beginning
- Home – Dealing with assignments being completed at home, or occasionally recreational e.g. Maintaining diary

Word Processing

Advantages-:

- Faster
- Can edit documents
- Change font style, size, color
- Change layout
- Print many copies
- Less noise
- Add pictures
- Make tables
- Email documents

Disadvantages-:

- Equipment costs
- Upgrade software
- Train staff
- More complicated
- Virus, popup

Introduction to parts of a word window

Below is the table, describing parts of Word Windows:

- **Title Bar:-**Displays the name of the currently active word document.
- **Ruler Bar: -**Allows you to format the vertical and horizontal alignment of text in a document.
- **Tool Bars:-**Word has a number of tool bars that help you perform task faster and with great ease. Example: Standard Tool Bar, Formatting Tool Bar
- **Status Bar-:** Displays information about the currently active document.
- **Scroll Bar-;** Allows scrolling the content or body of document.
- **Workspace-:** Area in the document window where text can be entered.
- **Menu Bar-:** Contains menus doing separate tasks.

How to enter and edit text -:

- You can enter text by using the keyboard
- Editing text may involve inserting, deleting, or amending
- Other possible methods are using   and optical character recognition (OCR)
- You can do this by speaking into a microphone or using voice recognition software

Word Wrap

With a word processor, when you reach the end of a line you don't need to use their turn key to make a new line.

Word processor will make a new line automatically and it will move partly completed words at the end of one line to the start of the next line

Word Count

- It is very useful if you are writing an essay or an article containing a certain amount of words

- Instead of using spell checker to count words use word count it saves time.

Inserting Clip Art

- To insert clip art Click on insert and then picture Then click on Clip art Some pictures from Clip art

Mail merge

The process of linking the fields in a database to a standard letter. It can be accessed by pressing the "Tools" tab and selecting Mail Merge.

Text Alignment

Text can be aligned in three different ways

- Left
- Right
- Centre
- Features of Word Processor

Search and Replace

We use this feature to replace a word a number of times in a document.

Spell Checker

The spell checker works by comparing the typed word to words in the computer's internal dictionary, any word it does not recognize it will place a red line underneath

Check

This feature works by highlighting sentences with grammatical errors, for example seen everyone coming along

Standard Paragraph

A standard paragraph is a piece of text that has been typed up, saved to backing storage and inserted into a document a number of times

Template

- A template is a readymade document, with placeholders for items like text and graphics

Introduction to databases

"A data base is an organized collection of data stored and accessed electronically from computer system. Where data bases are more complex they are often developed using formal design and modeling techniques."

A database is a collection of organized data, information and rerecords.

Purpose of data base

Database is information that a person needs in his personal, business, social and religious life and the power and purpose of information is not only in collecting and finding them but more importantly in using them.

Kids of data base

Structured database -: It is also called the structured data in which a record or file of information arranged in uniform format. These databases are usually storage of information with similar entries such as a list of persons born in a country, a medical database of patients' data, an inventory database of a company and many others.

Free-form database:- It is a loose collection of information, such as those you will find on the World Wide Web. A collection of your documents in the computer made from several programs can be considered as free-form database.

Types of data base

Operational database-: It is a dynamic database that is used by any organization in its day-to- day operation. They are used to collect data, maintain, modify and delete data.

Analytical database -: It is a static database, where data is rarely modified. This database is often used to store and track historical data to make long term projections and analysis.

Structuredthis model can be visualized as a parent –child relationship wherein a child may only have one parent but parent can have several other children. Another way of looking at this model is by visualizing an inverted tree. The single table acts as the root of the inverted tree and the other tables act as branches. To access the data from one of the tables, one has to pass through the root table. This model was popular in the many IBM Information Management Systems in the 1970s using mainframe computers. This model was developed to address in part the problems of the hierarchical model.

Statistical software packages

Statistical packages Definition:

"Statistical packages are collections of software designed to aid in statistical analysis and data exploration and provide a unified operating framework and common interface for data manipulation, visualization and statical analysis."

It is a discipline of mathematics and science both combined, that deal with.

- Collection
- Manipulation
- Analysis
- Interpretation

Uses of statistical packages:-

- Drawing conclusion and inference on which the decision making in any organization depends.
- Present large data in understandable form e.g. Graphs, tables
- Comparing data
- It is the major tool and the foundation of planning in any organization

Manual

The Data being dealt with is huge; analyzing it manually is very time – consuming, difficult and many-times erroneous.

Computers have proven to be a bliss for statisticians – efficient than doing manual

Processes:

- Simulation
- Storing the data
- Symbolic calculations
- Numerical and graphical data analysis Result presentation

Statistical software:

There are number of software available to manage statistical data – Statistical soft wares.

These programs –

- User-friendly
- Menu driven
- Interactive
- Attractive
- Self- explanatory
- E.g. BioEstat, Dataplot, MacAnova, MicrOsiris, Greti, Winstats, StatEasyetc

Statistical software:

- MS Word
- MS Excel
- Power point
- Multimedia

INTRODUCTION TO INTERNET&USE OF ELECTRONIC MAIL

INTRODUCTION-:

In today's workplace the use of Internet and emails has dramatically increased all over the world. Computers have revolutionized the way we conduct our daily life's and business. With the rise of the internet and emails in the workplace brings new business fundamentals to meet. These fundamentals must meet our demands in the workplace to ensure timely performance. Workplace policies should be implemented in a workplace to prevent time wastage.

INTERNET NEWS TODAY

- Over the last 40 years technology has developed in the workplace with use of computers
- Use of computers continues to soar in the 21st century
- Humans rely on computers to perform daily routine duties

DEFINITION OF INTERNET

The word internet is described is many ways. The best way to describe the word internet to you would be a computer system that allows millions of computer users around the world to share, transmit and exchange information.

DEFINITION OF EMAIL

Is defined as a system that allows people to send messages to each other by computer electronically.

STATEMENT OF INTERNET

The use of a company's internet and email access must be developed to provide clear and precise guidelines for all employees (including external contractors and consultants using the company's computer system) as to what constitutes acceptable use and what is considered as unacceptable use. The aim of this policy is to ensure that all employees using the company internet, intranet and e-mail system do so in a climate of mutual respect, ensuring at all

STATEMENT OF PURPOSE

Times that the confidentiality of company information is preserved. The company does not wish to discourage reasonable private use and will respect the privacy of employees in any monitoring situations in accordance with the provisions of the Workplace Surveillance Act 2005 (NSW) and the Privacy Act 1988 (Federal).

DEVELPURPOSE

- Consultation
- Coverage
- Cleary defined
- Employee's rights and obligations Implementation
- Conflict resolution
- Monitoring
- Breach of policy

KEY POLICY ELEMENTS

- Pop up warnings
- Training prior to implementation

- No harassment or abuse
- No copy right
- Maximum personal usage 30 minutes/day 90 minutes/week
- Social networking sites Maximum 5 minutes/day
- Usage Records may be used in Litigation
- NO blocking by Company of IR Related Transmissions

Computer Aided Teaching & Testing

CATT stands for "Computer Aided Teaching & Testing "The CATT program is designed to produce flexible learning environment for the students. The CATT program is available through the web page.

It is a User Friendly Teaching, Learning &Self-Testing Environment.

It generates unlimited questions for self-testing.

Students can access the course material via the web at any time & from any place at their convenience.

CATT (Introduction)

This is a program that is user friendly to both the Lecturers & Students.

It provides:

- Management of Courses;
- Assists the Students to Students in a more Effective Way;
- Imposes Minimal Cost on Students.
- The aim of the program is also:
- To design a programme that is user friendly & widely available as a web based application tailored to specific needs of the students in the course.

The Teaching Learning Aspects

The teaching learning aspect of CATT program consists of:

- worked examples,
- glossary of definitions
- additional course notes
- To help students reinforce their understanding & learning.
- The Learning Aspects consists of: Quizzes & Self Tests.
- E.g.: Web CT allows a time limit to be set for each quiz & marking is immediate & automatic.
- The programme will record results, answers & solutions to students immediately after they have finished their quizzes.
- This immediate feedback is a great help in learning.
- Self-Tests are exercises for students to practice at their own pace & no time limit is imposed.
- A Strong Point of Self-Test Process is it generates random questions.
- Students are presented with one question at a time, on submitting their answers MAPLE (a mathematical s/w) checks for correctness & displays the results.
- CATT programme provides a flexible learning environment for the students, while reducing the need for a great deal of human resource in course management process.
- Lecturers producing course materials in feature can use the templates that have been created.
- Students using the program need minimal computer skills.

THE TEACHING AND LEARNING ASPECTS

The teaching aspect of the CATT programme consists of worked examples, glossary of definitions and additional course notes to help students to reinforce their understanding and learning.

The learning aspect consists of quizzes and self-tests.

Quizzes are similar to the current conventional quizzes given to students. Web CT allows a time limit to be set for each quiz and marking is immediate and automatic. The programme will record results and feedback the results, answers and solutions to students immediately once they have finished their quizzes.

This immediate feedback is a great help in learning. The number of attempts that a student can make on a particular quiz is limited.

SELF TESTS

- Self-tests are exercises for students to practice at their own pace and no time limit is imposed.
- The tools used to produce the self-test questions are HTML, Maple and Perl-CGI.
- The self-test process is that it generates random questions.
- Students are presented with one question at a time. On submitting their answers, Maple checks for correctness and displays the results.
- Students can ask for new questions if they want more practice or they can easily link back to the lessons and examples to reinforce their understanding