NATIONAL OPEN UNIVERSITY OF NIGERIA

COURSE CODE :EDU 776

COURSE TITLE:
HOSPITAL INFORMATION SYSTEM

MPA 776: HOSPITAL INFORMATION SYSTEM.

COURSE GUIDE

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Introduction

The availability of accurate, timely, reliable and relevant health information is the most fundamental step toward informed public health action. Therefore, for effective management of health and health resources, governments at all levels have overriding interest in supporting and ensuring the availability of health data and information as a public good for public, private and non-governmental organizations' utilization. The role of government must extend to ensuring standardization and financing of health data infrastructure, especially with respect to establishing and strengthening relevant organizational structures for health management information system activities. It should also extend to procurement and installation of appropriate information technology, staff training and collection, storage, analysis, dissemination and use of health information as well as in financing essential systems and biological research.

MPA 776: Hospital Information System is a course that will steer you up into modern technology in information in the hospital system. The Course Guide tells you briefly what the course is about, the course materials to be used and how you can work your way through these materials. Tutor marked assignments are also provided at the end of each unit.

The Course

The Course is expected to expose you to communication for health education as hospital health administrator, health information and basic statistics, managing health information units and usefulness of information technology in programme planning and implementation. This knowledge is crucial to you in order to prepare you for the modern trends and management of information in the hospital services.

Course Aim

The aim of the course is to present to you a concise insight into the hospital management system, the establishment of an effective hospital information system to be used as a management tool for informed decision-making at all levels of healthcare service delivery.

Course Objectives

After going through this course by the learners, you should be able to:

- provide indicators for evaluating performances of the health services and their impacts on the health status of the population.
- provide information to those who need to take action, those who supplied the data and the general public.
- discuss the relevance of communication for health education by health administrators.
- describe the basic health information.
- explain how to manage health information units.

- discuss the usefulness of information technology in programme planning and implementation.

Working through the Course

In order to successfully complete this course, you are required to read and study the course units, read the reference books and do a lot of browsing (modern information technology) provided by the university. Each unit also contains Tutor marked assignments which would be of tremendous assistance to you.

Course Material

Major components of the course are:

- Course Guide
- Study Units
- References/Further Readings

Study Units

Unit 1: Communication for Health Education by Health Administrators I.
Unit 2: Communication for Health Education by Health Administrators II.
Unit 3: Health Information and Basic Statistics I.
Unit 4: Health Information and Basic Statistics II.
Unit 5: Health Information and Basic Statistics Sampling.
Unit 6: Managing of Information Technology.
Unit 7: Usefulness of Information Technology in Programme Planning and the Implementation

Assessment

There are two aspects to the assessment of the course. Firstly, the tutor-marked assignment which gives the learner a good opportunity to excel if properly done and secondly, there will be a written final examination. In dealing with the assignments, you are expected to apply information, knowledge and strategies gathered during the course.

Tutor-Marked Assignment (TMA)

The Tutor-marked assignment is the concurrent assessment of your course which accounts for 40% of the total score for now. You are expected to answer the required number of tutor-marked assignments to be decided by the University Authority, the same type written and submitted to the facilitator through the Counsellor through grading before you are allowed to write the final examination in the course.

End of Course Examination

The final examination on this course is expected to cover a three hours duration which has a value of 60% of the total course grade except otherwise decided by the University.

Summary

The course intends to provide you with basic knowledge of hospital information system and upon completion of the course, you are better prepared for the modern challenges ahead of you as a hospital administrator. You will be able to use modern technology to gather information as health indicators, store the health data, manage the equipment and retrieve the health data for decision making.

References/Further Readings

Federal Ministry of Health (2006). National Health Management Information System Policy , Abuja.

Kumar,K.J.(1982).Business Communication;A modern approach,Munbai:Jaico Publication House.

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Unit 1: Communication for Health Education by Health Administrator I

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1.0 INTRODUCATION

This course is on Hospital Information systems. The next two units will look at communication and heath education which will be the foundations for this course but this

unit will focus on communication process, types of communication, barriers of communication, health communication, health education and approach to health education communication can be regarded.

Communication can be regarded as a two way process of exchanging or shaping ideas, feelings and information. Broadly it refers "to the countless ways that humans have of keeping in touch with one another"

Communication is more than mere exchange of information. It is a process necessary to pave way for desired changes in human behaviour, and informed individual and community participation to achieve predetermined goals. Communication has, in recent years, developed into an interdisciplinary science drawing richly from social sciences. With the development of newer methods of communication and information explosion, the mental development of the humans has expanded considerably for clearer thinking, better social inter-sectoral coordination.

Communication and education and interwoven. Communication strategies can enhance learning. The ultimate goal of all communication is to bring about a change in the desired direction of the person who receives the communication. This may be at the cognitive level in terms changing existing patters of behaviour and attitudes; and it may be psychomotor in terms or acquiring new skills. These are referred to as learning objective

2.0 OBJECTIVE

At the end of this unit the learner should be also to:

- Define communication
- Explain the communication process.
- Disiuts the types of communication
- State barners of communication.
- Discuse the functions of health communication
- Define health education and state approach to health education

3.0 Main Content

Communication is part of our normal relationship with other people. Our ability to influence others depends on our communication skills, e.g., speaking, writing, listening, reading and reasoning. These skills are much needed in health education. The developing countries are now beginning to exploit the current "communication revolution" to put today's health information at the disposal of families, to help people to achieve health by their own actions and efforts. It is said that without communication an individual could never become a human being, without mass communication, he could never become a part of modern society (3).

3.1: THE COMMUNICATION PROCESS

Communication which is the basis of human interaction is a complex process. it has the following main components (fig.1)

1. Sender (source)

2. Receiver (audience)
3. Message (content)
4. Channel (s) (medium)
5. Feedback (effect)

1. Sender

The sender (communicator) is the originator of the message. To be an effective communicator, he must know:

- his objectives, clearly defined
- his audience: it's interests and needs
- his message
- channels of communication
- his professional abilities and limitations

The impact of the message will depend on his own social status (authority), knowledge and prestige in the community.

2. Receiver

All communications must have an audience; this may be a single person of a group of people. Without the audience, communication is nothing more that mere noise. It is the element of audience and their frame of mind (e.g., opinions, attitudes, prejudices) which lends meaning to all the different types of communication.

The audience may be of two types: the controlled and the uncontrolled. A controlled audience is one which is held together by a common interest. It is a homogeneous group.

An uncontrolled or “free” audience is one which has gathered together form motives of curiosity. This type of audience poses a challenge to the ability of the educator. The more homogenous audience is the greater are the chances of an effective communication.

3. Message

A message is the information (or technical know- how which the communicator transmit to his audience to receive, understand, accept act upon. It may be in the from of words, pictures or signs. Health communication may fall in many cases, if its messages is not adequate.

A good message must be

- in line with the objective(s)
- meaningful
- based on felt needs
- clear and understandable
- specific and accurate
- timely and adequate
- fitting the audience
- culturally and socially appropriate

Transmitting the right message to the right people at the right time is a crucial factor in successful communication.

4. Channels of communication

By channels is implied the “physical bridges” or the media of communication between the sender and the receiver.

Media systems

The total communication effort is based on three media systems.

a. Interpersonal communication
b. Mass media
c. Traditional or folk media

a. Interpersonal communication

The most common channel of communication is the interpersonal or face-to-face communication. Being personal and direct it is more persuasive and effective than any other form of communication. Interpersonal communication is particular important in influencing the decision of the undecided person. The superiority of interpersonal communication over mass for creation of motivation effect been well documented

When the message relayed via mass media gets diffused in the community, it is picked up by the interpersonal and informal networks. The message is then subject to debate and discussion by interpersonal communications. On the basis of this scrutiny a consensus is gradually built up in the community whether to accept or reject message.

b. Mass media

In mass communication the channel is one or more of the following “mass”, viz, TV radio, printed media, etc mass media have the advantage of reaching a relatively larger

population in s shorter time than is possible with other means being one way channel of communication, mass media carry message only from the center to the periphery feedback mechanisms are poorly organized. Being impersonal media, they are usually not effective in changing established models of behaviour.

c. Folk media

Every community has its own network of traditional or folk media such as folk dances, singing drama, *Nautank*i in Uttar Pradesh, Burrkatha in Anhdra Pradesh and Harikatha in Western India besides informal group gatherings, caste or religious meetings. These are important channels of communication close to the cultural values of the rural population. They have been the principal instruments of preserving the cultural heritage. Health messages may be communicated through these traditional media.

Every channel of communication has its advantages and limitations. For instance by verbal communication, demonstrations are needed. The proper selection and use of channels result successful communication. Since effective communication is seldom achieved through the use of one methods alone, an attempt should be made to combine a variety of methods to accomplished the educational purpose. Health education uses a variety of methods to help people understand their own situations and choose actions that will improver their health.

5. Feedback

It is the flow of information from the audience to the sender, it is the reaction for the audience to the message. If the message is not clear to otherwise not acceptable the

audience may reject it outright. The feedback is generally obtained through opinion polls, attitudes surveys and interviews. It can rectify transmission errors

3.2 Type of communication

1. One-way communication (Didactic Method)

The flow of communication is one way from the communicator to the audience. The familiar examples is the lecture method in class rooms. The drawbacks of the didactic method are:

- Knowledge is imposed
- Learning is authoritative
- Little audience participation
- No feedback
- Does not influence human behaviour

2. Two way communication (Socratic Method)

The Socratic method is a two way method of communication in which both the communicator and the audience take part. The audience may raise question, ad add their own information. Idea and opinion o the subject. The process of learning is active and democratic". It is more likely to influence behaviour than one way communication.

3. Verbal communication

The traditional way of communication has been by word of mouth. The advent of written and printed mater are of comparatively recent origin. Direct verbal

communication by word of mouth may be loaded with hidden meaning. It is persuasive. Non direct or written communication may not be as persuasive as the spoken word.

4. Non-verbal communication

Communication can occur even without words. It includes a whole range of bodily movement, postures, gestures, facial expressions (e.g., smile, raised eye brows, frown, staring, gazing etc). Silence is non-verbal communication. It can speak louder than words.

5. Formal and informal communication

Communication has been classified into formal (follows lines of authority) and informal (grape-vine) communication. Informal network (e.g. gossip circles) exists in all organizations. The informal channels may be more actively, if the formal channels do not cater tot eh information needs.

6. Visual communication

The visual forms of communication comprises: charts and graphs, pictogram, tables, maps poster etc.

7. Telecommunication and internet

Telecommunication is the process of communicating over distance using electromagnetic instrument designed for the purpose. Radio, TV and internet etc are mass communication media, while telephone, telex (or teletype) and telegraph are known as point to point telecommunication systems. The point to point systems are closer to interpersonal

communication. With the launching of satellites, a big explosion of electronic communication has taken place all over the world.

3.3 Barriers of communication

Health education may often fail due to communication barriers between the educator and the community, these may be:

1. Physiological – difficulties in hearing, expression
2. Psychological – emotional disturbance, neurosis, levels of intelligence, language or comprehension difficulties.
3. Environmental – noise, invisibility, congestion
4. Cultural - - illiteracy, level of knowledge and understanding, customs, beliefs, religion, attitude, economic and social class differences, language variation, cultural difficulties between foreigners and nationals, between urban education and the rural population.

Even when health services are readily available, the social and cultural barriers can present serious problems to the achievement of health behaviour change. These barriers should be identified and removed.

3.4 Health communication

Health is the concern of everyone for everyone. Health communication is therefore an important area of communication. The term “health education is often used synonymously with health education, which itself suggests “outward and downward” communication of knowledge. Health education is the foundation of a preventive health care system

Function of health communication

Health communication has to cater to the following needs:

1. Information
2. Education
3. Motivation
4. Persuasion
5. Counseling
6. Raising morals
7. Health development
8. Organization

1. Information

The primary function of health communication is to provide scientific knowledge or information to people about health problems and how to maintain and promote health. People rarely seek such information although they have a right to know the facts about health and disease.

Information should be easily accessible to the people exposure to the right kind of health information can

- eliminate social and psychological barriers of ignorance, prejudice and misconceptions people may have about health matters;
- increase awareness of the people to the point that they are able to perceive their health needs and
- influence people to the extent that unfelt needs become felt needs, and felt needs become demands.

The government, the media and health providers have an important social responsibility to provide factual and balanced health and health related information to the people and awaken their interest on the basis of which they can make informed decisions. But the assumption that the acquisition of information will mean a change in an individuals' behavior and attitudes is fallacious. Most people make important decision regarding their health only after much thought perhaps over a period of time ad after several educational contact. The cultural values, beliefs and norms of the people influence their acceptance of health information. Correct information is a basic part of health education.

2. **Education**

Education of the general public is an integral part of a preventions oriented approach to health and disease problems and the basis of all education is communication. Education can help to increase knowledge. It is often assumed that knowledge determines attitudes and attitudes determines behaviour

Health education can bring about changes in life styles and risk factors of disease. Most of the world's major health problem and premature death are preventable through changes in human behaviour at lose cost. But education alones is insufficient to achieve optimum health. The target population must have access to proven preventive measures or procedures

3. Motivation

It is the power that drives a person from within to act. One of the goals of health communication is to motivate individuals to translate health information into personal behaviour and life style for their own health. Motivation includes the stages of interest, evaluation and decision making. Health communication assist the individual in passing from the stage of awareness and interest to the final stage of decision making and adoption of the new ideal or programmes directed at individuals who already have some strong motivation, in patient with chronic illness or a disability, those facing acute crisis such as surgery or childbirth. This suggests that probably the quickest off will come in the area of patient education.

4. Persuasion

Persuasion is the art of winning friends and influencing people. It is an art that does not employ force or deliberate manipulation. The sole purpose of communication is to influence. Persuasion is a conscious attempt by one individual to change or influence the general beliefs, understanding values and behavior of another individuals or group of individuals in some desired way ". Persuasive communication is more effective than coercion or authoritative communication. Persuasion can

change life style and modify the risk factors of disease. When persuasive communication is deliberately employed to manipulates feelings, attitudes and beliefs, it becomes “propaganda” or brain washing.

5. Counseling

Counseling is a process that can help people understand better and deal with the problems and communicate better with those whom they are emotionally involved. It can improve and reinforce motivation to change behaviour. It can provide support at times of crisis. It helps them face up to their problems and to reduce or solve them.

Counseling is different from advising. It implies choice, not force. Advising amounts to directing people and cautioning them to some do’s and don’ts

In different circumstance different people can undertake counseling. A counselor should be able:

- to communicate information
- to gain the trust of the people
- to listen sympathetically to people who are anxious, distressed and possibly hostile
- to understand other person’s feelings and to respond to them in such a way that the other persons can feel free to express his feelings
- to help people reduce or resolve their problem

Thus counseling relies heavily on communication and relationship skills. Consoling is an important part of treatment, disease prevention an health promotion. It helps people to avoid illness and to improve their lives though their own efforts. Counseling develops positive attitudes. It is an integral part of all health care programmes.

6. Raising morale

Morale is "the capacity of a group of people (or team) to pull together persistently or consistently. Communication vertical and horizontal, internal and external is the first step in any attempt to raise morale of the health team or a group of people.

7. Health development

Communication can play a powerful role in health developments by helping to diffuse knowledge in respect of the goals of development and preparing the people for the roles expected of them. But is own role is essential, supportive. Judicial use of communication media can contribute to health development.

8. Health organization

Communication is the life and blood of an organization. There are two major directions in which communications within an organization flow. These are vertical and horizontal communications. Vertical communication can be downward or upward. Horizontal or cross communication takes places usually between equals at any level. The downward communication extend from top administrator down through the hierarchy of professionals and non-professional to the beneficiaries or employees. He direction in which communication flows an organization suggests the degree of freedom in the internal communication network.

Communication is an important dimension of health organization. It is an important means of intra and inter-sectoral coordination.

3.5 Health education

Health education is a team commonly used and referred to by health professionals.

Definitions

Health education is indispensable in achieving individual and community health. It can help to increase knowledge and to reinforce desired behaviour patterns. But there is no single acceptable definition of health education. A variety of definitions exist. Concepts of health education as a process or an variety for inducing behavioral changes are emphasized in the following definitions.

1. Health education is the translation of what is know about health, into desirable individuals and community behaviour patterns by means of an educational process.
2. The definition adopted by John M last is "The process by which individuals and group of people learn to behave in a manner conducive to the promotion, maintenance or restoration of health.
3. Any combination of learning opportunities and teaching activities designed to facilitate voluntary adaptation of behave that are conducive to health
4. The definition adopted by the national conference on preventive medicine in USA is heath education is a process that informs, motivates and helps people to adopt and maintain healthy practices and lifestyles, advocates environmental change as needed to facilitate this goal and conducts professional training and research to the same end".
5. Health education is the part of health care that is concern with promoting healthy behaviour.

Alma Ata Declaration

The Decalration of Alma Ata (1978) by emphasizing the need for "individual and community participation" gave a new meaning and direction to the practice of health education. The dynamic definition of health education is now as follows:

A process aimed at encouraging people to want to be healthy to known to stay healthy, to do what they can individually and collectively to maintain health, and to seek help when needed"

The Alma-Ata Declaration has revolutionized the concepts and aims of health education:

The modern concepts of health education emphasis on health behaviour and related actions of people.

Health education and behaviour

The behaviors to be adopted or modified may be that of individuals, group (such as families, health professionals, organizations or institutions) or entire community.

Strategies designed to influence the behaviour of individuals or group will vary greatly depending upon the specific disease (or health problem) concerned and its distribution in the population as well as upon the characteristics and acceptability of available methods preventing or controlling that disease (or health problem).

Health education can help to increase knowledge to reinforce desired behaviour patterns.

It is clear that education is necessary, but education alone is insufficient to achieve optimum health. The target population must have access to proven preventive measures or procedures.

Changing concepts

Historically health education has been committed to disseminating information and changing human behaviour. Following the Alma-Ata Deceleration adopted in 1978, the emphasis has shifted from.

- Prevention of disease to promotion of healthy lifestyles.
- The modification of individual behaviour to modification of social environment in which the individual lives.
- Community participation to community involvement; and
- Promotion of individual and community "self reliance.

Aims and objectives

The definition adopted by WHO in 1969 and the Alma Ata declaration adopted in 1978 provide a useful basis for formulating the aims and objectives of health education, which may be stated as below.

1. To encourage people to adopt and sustain health promotion lifestyle practices;
2. To promote the proper use of health services available to them.
3. Too arouse interest new knowledge improve skills and change attitudes in making rational decision to solve their own problems; and

4. To stimulate individual and community self-reliance and participation to achieve health development through individual and community involvement at very step from identifying problem to solving them.

The educational objectives are aimed at the group to be taught in the educational programme. The objectives flow from the health needs which have been discovered. They should be carefully unambiguously defined in terms of knowledge to be acquired, behaviour to be acquired or actions to be mastered. They must be pertinent of the programme is to appropriate and successful.

The focus of health education is on people and on action. Its goals are to make realistic improvements in the basic quality of life. Many health education programmes hope, in some way, to influence behaviour or attitudes. The implication of these new concepts is that health education is an integral part of the national health goals. The fact remains that effective health education has the potential for saving many more lives than has any one research discovery in the foreseeable future.

Role of health care providers

It is clear that education is necessary, but education alone is not sufficient to achieve optimum health. The role of health care providers in this regard comprises to:

a. provide opportunities for people to learn how to identify and analyze health and health and health related problem, and how to set their own targets and priorities;

b. Make health and health related information easily accessible to the community;
c. Indicate to the people alternative solutions for solving the health and health-related problems they have identified; and
d. People must have access to proven preventives measures.

3.6 Approach to health education

There are 4 well-known approaches to health education

1. **Regulatory approach (managed prevention)**

Regulation in the context of health education may be defined as nay governmental intervention, direct or indirect, designed to alter human behaviour. Regulations may be promulgated by the state by a variety of administrative agencies. Regulations may take many forms ranging from prohibition to imprisonment.

The reasons for the failure of the coercive approaches are not far to seek; in the first place, the cause of disease (medical or social) cannot be eradicated by legislation, at the most the government can make laws to prevent a person spreading disease in his community, as for example vaccination in an emergency. Secondly in areas involving personal choice (e.g. diet, exercise, smoking) no government can pass legislation to force people to eat a balanced diet or not to smoke. It amounts to taking away of the rights of the individual. The disastrous sterilization campaign of 1976 in India which led to the congress in the 1977 elections is a case in point. The lesson learnt is that it

is difficult to enforce a law unless the majority of people are in favour of it and if it does not interfere with the rights to the individual.

However, laws may be useful in tome of emergency or in limited situations such as control of an epidemic disease or management of fairs and festival. Even in cases where it is the duty of the government to make law to prevent the spread of disease (e.g., AIDS) it is difficult to enforce laws without a vast administrative infrastructure and considerable expenditure. To a degree, the people must be ray to accept a law. In short, the coercive approach runs counters to the basic tenet of health education, we do not force people to change. In specific situations, legislation can be used to reinforce the pressure to change collective behaviour.

2. Services Approach

This approach was tried by the Basic Health Services in 1960's. It aimed at providing all the health services needed by the people at their door steps on the assumption that people would use them to improve their own health. This approach proven a failure because it was not based on the felt-needs of the people. For example, when water-seal latrines were provided by the government, free of cost, many people in the rural areas did not make use of them because it was not their habit to use latrines. The lesson is simple- the people will not accept a programme or services even if it is offered free of cost, unless it is based on their felt-needs.

3. Health Educational Approach

There are many problems (e.g., cessation of smoking, use of safe water supply, fertility control) which can be solved only through health education. It is general belief in western democracies that people will be better off if they have autonomy over their when lives, including health affairs on which an informed persons should be able to make decisions to protect his own health. These are the higher goals of health education. However, if the necessary behaviour changes are to take place, people must be educated through planned learning experiencing hat to do, and be informed, educated and encouraged to make their own choice for a healthy life. This approach is consistent with democratic philosophy which does not "order" the individual. The result s are slow, but enduring.

The mass media and social organizations must be mobilized to help introduce new attitudes and new habits without conflicting with the masses and the collective reaction to particular change.

Since attitudes and behavioral patterns are formed early in life. We must move back in time and start health education with young population. The assumption is that behaviour is more easily controlled or developed in young population than adults.

4. Primary health care approach

This is a radically new approach starting from the people with their full participation and active involvement in the planning and delivery of health services based on principals of primary health care, viz community involvement and intersectoral coordination. The underlying objectives is to help turn, can be done if the

people receive the necessary guidance and finding workable solutions. This approach is a fundamental shift from the earlier approaches.

Health education versus propaganda

Health education is not health propaganda, it is more than mere information or propaganda. To educate means to cause or facilitate learning; propaganda means to spread particular systemized doctrine. The differences between health education and propaganda drawn up by central health education Bureau, Govt. of Indian.

4.0 : Conclusion

Communication and education are interwoven, communication strategies can enhance learning. The ultimately goals of all communications is to bring about a change I the derived direction of the persons who receives the communication.

5.0 : Summary

This unit has looked into the concept of communication, the communication process types of communication, barriers of communications health education, health communication and approach to health education.

6.0 : References

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7.0 : Tutor Marked Assignment

Discuss the difference between health information, health communication and health education.

Unit 2: Models of Health Education

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7.0: Tutor Marked Assignment

1.0 Introduction

This unit is a continuation of Unit 1 focused on models of health education, principles of health education, practices if health education and finally education. I am sure as your keenly thoroughly this unit your knowledge will be increased.

2.0 Objectives

The learner should be able to do the following at the end of this unit.

- account for models of health education
- discuss the content of health education
- list the principles of health education
- Explain the practice of health education
- State steps of planning and management of health education.

3.0

3.1 Model of health education

During the past few decades, a number of health education models have been developed. They include the following:

1. **Medical model**

Most health education in the past has relied on knowledge transfer to achieve behaviour changes. The medical model is primarily interested in the recognition and treatment of disease (curing) and technological advances to facilitate the process. It is concerned with disease as defined by the doctor) or opposed to illness (as defined by the client).

Originally health education developed along the lines of the bio-medical views of health and disease. The emphasis was on dissemination of health information based on scientific facts. The assumption was that people would act on the information supplied by health professional to improve their health. In this model social, cultural ad psychological factors were through to be of littler no important. The medical mo\del did not bridge the gap between knowledge and behaviour

2. **Motivation Model**

When people did not act upon the information they received, health education started emphasizing “motivation” as the main force to translate health information into the desired health action. But the adoption of a new behaviour or idea is not a simple act,

it is process consisting of several stages through which an individual is likely to pass before adoption. In this regard, sociologists have descried 3 stages in the process of change in behaviour.

The individual first goes through awareness or getting general information about the subjects. In health education we must first create awareness of health needs and problems through a programme of public information. Mere awareness is not of much value unless it leads to motivation. Motivation includes the stages of interest, evaluate and decision making. The individual evinces interest in the subject; he may seek more detailed information about the usefulness, limitations or applicability of the new idea or practices. He then evaluates the various aspect (social, psychological, economic) of the information received, if necessary by consulting others. Such an evaluation is a mental whether to accept or reject the new idea, programme, proposal. At this stage, interpersonal communication (friends, kinship groups, technical persons) is vital to lend support to this decision. Conviction leads to action, adoption or acceptance of the new idea. The new idea or acquired behaviors becomes part of his own existing values. This is called internatiolization. Effective communication strategy should be evolved to help the individual in passing from one stage to another.

The above stages are not necessarily rigid; their may be skipping of stages. It is also found that in the same community, people may be in different stages of the adoption process. Adoptions are slow at first and increases as more and more people accept the practice.

3. **Social Intervention Model**

Soon, however it was realizes that the public health problems facing us today are so complex that the traditional motivation approach is insufficient to achieve behavioral change, as for example, reducing smoking, adoption of small family norm, raising the stage of marriage, elimination of dowry, etc.

The motivation model ignored the fact that in a number of situation, it is not the individual who needs to be changed but the social environment which shapes the behaviour of individual and the community. It is often found that people will not readily accept and try something new or novel until it has been "legitimated" (or approved) by the group to which they belong. Most of us prefer to do only the things commonly done by our group. This highlights the importance of group support in helping reaching the decision and taking action. Adoption of a new idea such as vasectomy or loop insertion is facilitated if there is a group support. This gave birth to the development of social intervention model of health education. An effective health education model is based on precise knowledge of human ecology and understanding of the interaction between the cultural, biological, physical and social environmental factors.

In sum, a coherent strategy needs to be developed involving all the ways to change behaviour and to recognize that the approach will different for different behaviour one wants to have. The need is to a programme of pars. Reliance on only one method is likely to lead to failure. A combination of approaches using all methods to change life styles and appropriate use of medical care will be necessary.

Content of Health Education

The scope of health education extends beyond the conventional health sector. It covers every aspect of family and community health. While no definite training curricula divided into the following divisions for sake of simplicity. Since health education has a limited impact directed from general education, ost of the needed information must be integrated into the educational system (by way of books, class room materials, etc.) and must have the young population as the principal target.

1. **Human Biology**

Understanding health, demands and understanding of the human biology, i.e structure and functions of the body how to keep physical fit-the need for exercise, rest and sleep; the effects of alcohol, smoking and drugs on the body; cultivation of healthy life, etc. Reproductive biology is another are of current interest. UNICEF's state of the health children report 1989" has drawn up a sic list of health information which it believes every family has a right t know. The list comprises of child spacing, breast feeding, safe motherhood, immunization, weaning and child growth, diarrhea disease, respiratory infections house hygiene which could enable families to bring about significant improvement in their own and their children's health.

The best place to teach human biology is the school. It is only the school, through its sequential health curriculum which can provide continuous in-depth learning

experiences for millions of students. The provision of information and advice on human biology and hygiene is vital for each new generation.

2. Nutrition

The aim of nutrition education is to guide people to choose optimum and balanced diets, remove prejudices and promote good dietary habits- not to teach the familiar jargon of calories and the biochemistry of nutrients. Nutritional problems such as ignorance but the value of breast feeding beyond the first of life, misconceptions about proper weaning, ignorance of the appropriateness of certain diets for infants and pregnant women, traditional food allocation patterns within the families, etc. can be best solved by nutrition education. In recent years, the link between dietary habits and certain chronic disease of middle age such as obesity, diabetes and cardio-vascular disease ahs been established. Nutrition education is major intervention for the prevention of malnutrition, promotion of health and improving the quality of life.

3. Hygiene

This has two aspect-personal and environmental. The aim of personal hygiene is to promote standards of personal cleanliness within the setting of the condition where people live. Personal hygiene includes bathing, clothing, washing hands and toilet; care of feet and teeth; spiting coughing, sneezing, personal appearance and incubation of clean habits in the young. Training personal hygiene should begin at a very early age and must be carried through school age. Environmental hygiene has two aspects domestics and community. Domestic hygiene comprises that of the home, use of soap, need for fresh air, light and ventilation; hygiene storage of foods; hygiene disposal of wastes, need to avoid

pest, rats, mice and insect. Improvement of environmental health is a major concern of many governments and related agencies throughout the world. In many areas, poor sanitary practices among the people have their roots in centuries old customs, styles of living and habits. These are not easily altered.

An environmental sanitation programme should include health education. It is not enough to provide sanitary wells, latrines and wastes collecting facilities. People will continue to suffer from the diseases caused by poor sanitation if they do not use the facilities. If health education approach is taken the people will participate from the beginning in identifying their sanitation problems and will choose the solutions and facilities they want. They will be more likely to sue these facilities and improve their health.

4. Family Health

The family is the first defence, as well as the chief reliance for the well being of its members. Health largely depends on the family's social and physical environment and its lifestyle and behaviour. The role of the family in health promotion and in prevention of disease, early diagnosis and care of the sick is of crucial importance. One of the main tasks of health education is to promote the family's self reliance, especially regarding the family's responsibilities in child bearing, child rearing, self care and in influencing their children adopt a healthy life style.

5. Disease prevention and control

Drug alone will not solve health problems without health education, a person may fall sick again and again from the same disease. The experiences of western countries have

shown the role of education in the eradication of cholera, typhoid, malaria and tuberculosis etc. Education of the people about the prevention and control of locally endemic diseases is the first of eight essential activities in primary healthcare. Several public health programmes are in operation on a national scale to eradicate diseases such as malaria, tuberculosis, leprosy, filaria, goiter, etc. The recent experience of malaria eradication has indicated that anti-malaria spray with insecticides cannot solve the problem without health education.

6. Mental health

Mental health problems occur everywhere. They become more prominent when major killer diseases are brought under control. There is a tendency to an increase in the prevalence of mental disease when there is a change in the society from an agricultural to an industrial economy and when people move from the warm intimacy of a village community to the isolation found fin big cities. The aim of education in mental health is to help people to keep mentally healthy and to prevent a mental breakdown. People should enjoy their relationships with others and learn to love and work without mental breakdown. There are certain special situations when mental health is of great important mother after child bright; child at entry into school for first time, school child entering the secondary school decision about a future career, starting a new family and at the time of widowhood. These are critical a period of life when external pressure tends to breakdown mental healthy worker could help people achieved metal healthy by showing sympathy, understanding and by social contact.

7. prevention of accidents

Accidents are features of the complexity of modern life. In the development countries they are taking an increasing toll of life and limb. Accidents occur in three main areas the home, road and the place of work. Safety education should be directed to these areas. It should be the concern of the engineering department and also the responsibility of the police department to enforce rules of road safety. Accidents occur in workshops, factories, railways and mines. Management must provide a safe environment and promote general order and cleanliness. There should be a place for everything, and everything should be in its place in the factory, in the home and in the office. The predominant factor in accidents is carelessness and the problem can be tacked through health education.

8. Use of health services

Many people particularly in rural areas do not known what health services are available in their community and many more do not know hat sings to look for that indicates that the public attitude towards health services is still apprehensive. There is ac communication in the form of feedback" for further improvement of health service.

One of the declared aims of health education is to inform the people about the health services that are available in the community and about they can utilize them (e.g.,. screening programmes, immunization, family planning services etc.) and use of health care resources.

Principles Of Health Education

Before we come to the practice of health education, we must know the principle involved. Health education brings together the art and science of medicine, ad the principles and practice of general education. The link is to be found in the social and behavioral sciences sociology, psychology and social anthropology.

Health education cannot be “given” to one person by another. It involves among other things the teaching learning and incubation of habits concerned with the objective of healthful living. Psychologist have given a great deal of attention to the learning process. Every individual learns and through learning develops the modes of behavior which he lives. Learning and teaching is a two way process of transaction in human relations, between the teacher and taught. The teacher cannot teach unless the pupils want to learn. Learning takes place not only in the class room, but also outside in the wider world. There is internal learning by which a man grows into an adult individual. It is possible to abstract certain principle of learning and use them in health education. These include:

1. Credibility: It is the degree to which the message to be communicated is perceived as trustworthy by the receiver. Good health education is based on facts- that means it must be consistent and compatible with scientific knowledge and also with the local culture, educational system and social goals. Unless the people have trust and confidence in the communicator, no desired action will ensue after receiving the message.
2. Interest: It is a psychological principle that people are unlikely to listen to those things which are not to their interest. It is salutary to remind ours elves that health teaching should relate to the interest of the people. The public is not interested in

health slogans such as “Yak care of your health” or be healthy”. A health education programme of this kind would be as useless as asking people to be healthy”, as a nutrition programme asking people to eat good food”. Health educators must find out the real health needs of the people. Psychologist call them “felt-needs”, that is needs the people feel about themselves. If a health programme is based on “felt needs” people will gladly participate in the programme; and only then it will be a people’s programme. Very often, there are groups who may have health needs of which they are not aware. This is especially true in India where about 50 per cent of the people are illiterate. The health educator will have to bring about recognition of the needs before he proceeds to tackle them.

3. Participation: Participation is a key word in health education. It is based on the psychological principle of active learning. Health education should aim at encouraging people to work actively with health workers and others in identifying their own health problems and also in developing solution and plans to work them out. Participation of family members in patient care will create opportunity for more effective, practically based health education. A high degree of participation tends to create a sense of involvement, personal acceptance and decision-making. It provides maximum feedback. The Alma-Ata Declaration states: The people have a right and duty to participate individually and collectively in the planning and implementation of their health care. If community participation is not an integral part health programmes are unlikely to succeed.

4. Motivation: In every person, there is a fundamental desire to learn. Awakening this desire is called motivation. There are two types of motives- primary and secondary. Primary motives (e.g. sex, hunger, survival) are driving forces initiating people to into action; these motives are inborn desires. Secondary motives are based on desires created by outside forces or incentives. Some of the secondary motives are praise, love, rivalry rewards and punishment, and recognition. In health education, motivation is an important factor that is the need for incentives is a first step in learning to change. The incentives may be positive (the carrot) or negative (the stick). To tell a lady, faced with the problem of overweight to reduce her weight because she might develop cardiovascular disease or it might reduce her life span, may have little effect; but to tell her that by reducing her weight she might look more charming and beautiful, she might accept health advice. When a father promises his child a reward for getting up early habit. In health education, we make use of motivation to change behavior. Motivation is contagious; one motivated person may spread motivation throughout a group. For example, men who have already had vasectomies are among the best advertisements of make sterilization.
5. Comprehension: In health education we must know the level of understanding, education and literacy of people to whom the teaching is directed. One barrier to communication is using words which cannot be understood. A doctor asked the diabetic to cut down starchy foods; the patient had no idea of starchy foods. A doctor prescribed medicine in the familiar jargon “one teaspoonful three times a

day, the patient, a village woman, had never seen a teaspoon, and could not follow the doctor's direction. In health education we should always communicate in the language people understand and never use words which are strange and new to the people. Teaching should be within the mental capacity of the audience.

6. Reinforcement: Few people can learn all that is new in a single period. Repetition at intervals I necessary. If there is no reinforcement, there is every possibility of the individual going back to the pre-awareness stage. If the message is repeated in difference ways. People are more likely to remember it.
7. Learning by doing: Learning is an action-process; not a memorizing one in the narrow sense. The Chinese proverb: if I hear. I forget: if I see. I remember; if I do, I know" illustrates the importance of learning by doing.
8. Know to unknown: In health education work, we must proceed from the concrete t the abstract"; from the particular to the general". From the simple to the more complicated from the easy to more difficult". And from the known to unknown. These are the rules in teaching. We start where the people are and with what they understand and then proceed to new knowledge. We use the existing knowledge of the people as pegs on which to hang new knowledge. In this way systematic knowledge is built up. New knowledge can give rise to an insight into the problem. The way in which medicine has developed from religion to modern medicine serves us as an illustration, the growth of knowledge from the unknown to the unknown. It is a long process full of obstacle and resistance, and we must not expect quick result.

9. Setting an example: The health educator should set a good example in the things he is teaching. If he is explaining the hazards of smoking, he will not be very successful if he himself smokes. If he is talking about the “small family norm he will not get far if his own family size is big.
10. Good human relations: Sharing of information, ideas and feelings happen most easily between people who have a good relationship. Building good relationship with people goes hand in hand with developing communication skills.
11. Feedback: Feedback is one of the key concept of the systems approach. The health educator can modify the element of the system (e.g message, channels) in the light of feedback from his audience. For effective communication feedback is of paramount importance.
12. Leaders: Psychologist have shown and established that we learn best from people whom are respect and regard. In the work of health education, we try to penetrate the community through the local leaders-the village headman. The school teacher or the political worker. Leaders are agents of change and they can be made use of in health education work. If the leaders are convinced first about a given programme, the rest of the task of implementing the programme will be easy. The attributes of a leader are: he understands the needs and demands of the community; provides proper guidance, takes the initiatives, is receptive to the views and suggestions of the people; identifies himself with the community ; self-less, honest, impartial considerate and sincere; easily accessible to the people; able to the people; able to control and comprise the various factions in the

community; possess the requisites skill and knowledge of eliciting cooperation and achieving coordination of the various official and no-official organizations.

Practice of health education

Educational materials should be designed to focus attention to provide new knowledge, to facilitate interpersonal and group discussion and to reinforce or clarify prior knowledge and behavior.

1. Audiovisual aids

No health education can be effective without audiovisual aids. They help to simplify unfamiliar concepts; bring about understanding where words, fail: reinforce learning by appealing to more than one sense, and provide a dynamic way of avoiding monotony. Modern science has made available an endless array of audiovisual aids which can be classified into three groups.

(1) AUDITORY AIDS

Radio, tape-recorder, microphones, amplifiers, earphones

(2) VISUAL AIDS

(a) Not requiring projection: Chalk-board, leaflets, posters, charts, flannelgraph, exhibits, models, specimens, etc.

(b) Requiring projection: Slides, films strips.

(3) COMBINED A.V AIDS

Television sound films (cinema), slide tape combination.

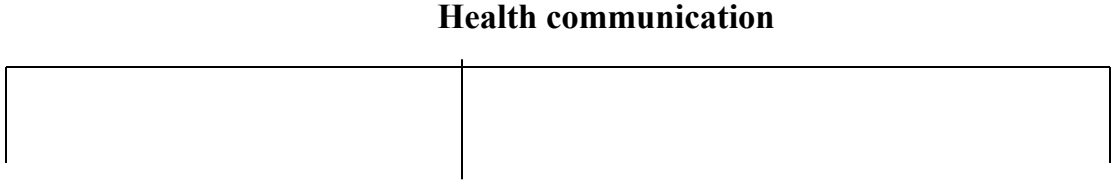
A knowledge of the advantages, disadvantage and limitations of each audio-visual aid is necessary in order to make proper use o them. Audiovisual aids are means to an end, not an end in themselves.

2. Methods in health communication

The methods in health communication may be grouped as in fig 3.

A rundown of the assets of mass media and personal communication methods is as shown in table 2.

Any one or a combination of these methods can be used selectively at different times depending upon the objectives to be achieved, the behaviour to be influenced and available funds.



3. Personal letters 3. Discussion methods 3. News paper

- group discussion 4. Printed material
- panel 5. Direct mailing
- symposium 6. Rosters
- workshop 7. Health museums
- conferences and exhibitions
- seminars 8. Folk methods
- role play 9. Internet

Methods in health communication

1. **Individual approach**

There are plenty of opportunities for individual health education. It may be given in personal interviews in the consultation room of the doctor or in the health center or in the homes of the people. The individual comes to the doctors or health center because of illness. Opportunity is taken in educating him on maters of interest-diet, causation and nature of illness and its prevention, personal hygiene, environmental hygiene etc. Topics for health counseling may be selected according to the relevance of the situation. By such

individual health teaching, we will be equipping the individual and the family to deal more effectively with the health problems. The responsibility of the attending physician in this regard, is very great because he has the confidence of the patient. The patient will listen more readily to the physician's health counseling. A hint from the doctor may have a more lasting effect than volumes of printed word. The nursing staff have also ample opportunities for undertaking health education. Florence Nightingale said that the nurse can do more good in the home than in the hospital. Public health nurses, health visitors and health inspectors are visiting hundreds of homes, they have plenty of opportunities for individual health teaching. In working with individuals, the health educator must first create an atmosphere of friendship and allow the individual to talks as much as possible. The biggest advantage of individual health teaching is that we can discuss, argues and persuade the individual to change his behaviour. It provides opportunities to ask question in terms of specific interests. The limitation of individual health teaching is that the numbers we reach are small, and health education is given only to those who come in contact with us.

2. Group approach

Our society contains groups of many kinds school children, mothers industrial patient etc. Group teaching is an effective way of educating the community. The choice of subject in group health teaching is very important: it must relate directly to the interest of

the group. For example, we should not braoch the subject of tuberculosis control to a mother who has come for delivery; we should talk top her about child-birth and baby care. Similarly, school children may be taught about oral hygiene; tuberculosis patient about tuberculosis and industrial workers about accidents. We have to select also the suitable method of health education including audio-visual aids for successful group health education. A brief account of the methods of group teaching is given below:

1. Chalk and talk (lecture)

A lecture may be defined as carefully prepared oral presentation of facts organized and idea by a qualified person. The chalk" lends the visual component. The chalk and talk communication has still a very important place in small group education. Its effectiveness depends to a large extent on the speaker's ability to write legibly and to draw with chalk on a black board. The talk should be based on a topic of current or health needs of the group. The group should not be more than 30 and the talk should not exceed 15 to 20 minutes. If the talk is too long people may become bored and restless.

The lecture method can be made more effective by combining with suitable audio-visual aids such as

a. Flipcharts: They consist of a series of chars (or posters), to the talk to be given. They are meant to be shown one after another. Each chart is flashed or displayed before a group as the talk is being given. The message on the charts must be brief and to the point. These charts are primary designed to hold attention of the group and help are the lecture to proceed.

b. Flannelgraph: A piece of rough flannel or khadi fixed over a wooden board provides an excellent background for displaying cut out pictures graph, drawings and other illustrations. The cut out pictures and other illustrators are provided with a rough cloth and they adhere at once when out on the flannel. Flannelgraph offers the advantage that pre-arranged sequence of pictures displayed one after another helps maintain continuity and ads much to the presentation. The other advantages that the flannelgraph is a very cheap medium, easy to transport and promotes thought and criticism

c. Exhibits: Objects models, specimens, etc convey a specific message to the viewer. They are essential mass media of communication, which can also be used in group teaching.

d. Films and charts: These are mass medial of communication. If used with discrimination, thy can be of value in educating small groups.

Lectures can be faulted on a number of groups. Their disadvantage includes the following: student s are involved to a minimum extent; learning is passive; do not stimulate thinking or problem solving capacity; the comprehensive of a lecture varies with the student; and the health behaviour of the listener is not essential affected.

2. Demonstrations

A demonstration is a carefully prepared presentation to show how to perform a skill or procedure. Here a procedure (e.g lumber puncture, disinfection of a well) is carried out

step by step before an audience or the target group, the demonstrator ascertaining that the audience understands how to perform it. The demonstrator involves the audience in discussion.

Demonstration as a means of communication ahs been found to have a high educational value in programmes like environmental sanitation (e.g installation of a hand pump construction of sanitary latrine); mother and child health of diseases (e.g scabies). The clinical teaching is hospital is based on demonstrations. This method has a high motivation value.

3. Group discussion

A "group" is an aggression of people interacting in a face-to-face situation". This contrast sharply to the group of students in a class room situation. Group discussion is considered a very effective method of ehalth communication. It permits the individual to élan by freely exchanging their knowledge, ideas and opinions. Group discussion provides a wider interaction among members than is possible with other methods. Where long term compliance is involved (e.g., cessation of smoking, obesity reduction) group discussion is considered valuable.

For effective group discussion, the group should comprise not less than 6 and not more 12 members. The participations are all seated in a circle, so that each is fully visible to all others. There should be a group leader who initiates the subject, helps the discussion in the proper manner, prevents side-conversations, encourages everyone to participate and sums up the scission in the end. If the discussion goes well, the group may arrive at decision which no individual member to have a person to record whatever is

discussed. The “recorder” prepares a report to the issues discussed and agreements reached. In a group discussion, the members should observe the following rules:

a. express ideas clearly and concisely
b. listen to hat others say
c. do not interrupt when other are speaking’
d. make only relevant remark
e. accept criticism gracefully and successful if the members know each other beforehand when they can discuss freely.

A well conducted group discussion with adequate resources is very effective in reaching decision, based on the ideas of all people. The decision taken by the group tends to be adopted more readily than in situation where the decision is a solitary one. Thus the group acceptance has a binding effect on the individual member to translate their acceptance into action. A well-conducted group discussion is effective for changing attitudes and the health behaviour of people.

Limitations: Group discussion is not without limitations. Those who are shy may not take part in the discussions. Some may dominate the discussion. Thus there may be unequal participation of members in a group discussion, unless properly guided. Some members may deviate from the subject and make discussion irrelevant or unprofitable.

4. Panel discussion

In a panel discussion, 4 to 8 persons who are qualified to talk about the topic sit and discuss a given oprobelm, or the topic, in front of a large group or audience. The panel comprises, a chairman or moderator and from 4 to 8 speakers. The chairman opens the

meeting, welcomes the group and introduces the panel speaker to resent their points of view. There is no specific agenda, no order of speaking and no set speeches. The success of the panel depends upon the chairman; he ahs to keep the discussion going and develops the train of thought. After the main aspect of the subject and explored by the panel speakers, the audience is invited to take part. The discussion should be spontaneous and natural. If members of the are unacquainted with this method, they may have a preliminary meeting, prepare the material on the subjects and decide upon the method and plan of presentation. Panel discussion can be properly planned and guided.

5. Symposium

A symposium is a series of speeches on a selected subjects. Each persons or expert present ands aspect of the subject briefly. There is not discussion among the symposium members like in panel discussion. In the end, the audience may raise questions. The chairman makes a comprehensive summary at the end of entire session.

6. Workshop

The workshop is the name given to a novel experiment in education. It consist of a series of meeting, usually four or more, with emphasize on individual world within the group, with the help of consultants and resources personal. The total workshop may be divided into small groups and each group will choose a chairman and a recorder. The individual work, solve a art of the problem, through their personal effort with the help of consultants, contributes to group work and group discussion and leave the workshop with a plan of action on the problem. Learning taken place in a friendly, happy and democratic

atmosphere, under expert guidance. The workshop provides each participant opportunities to improve his effectiveness as a professional worker.

7. Role playing

Role playing or socio-drama is based on the assumption that may values in a situation cannot be expressed in words, and the communication can be more effective if the situation is dramatized by the group. The group members who take part in the socio-drama enact their roles as they have observed or experienced them. The audience is not passive but actively experience them. The audience is not passive but actively concerned with the drama. They are supposed to pay sympathetic attention to what is going on, suggested, come up and take an active part by demonstrating how they feel a particular role should be handled, or the like. The size of the group is thought to be best at about 25. Role playing is a useful techniques to use in providing discussion of problems of human relationship. It is a particular useful educational devices for school children. Role playing is followed by a scission of the problem.

8. Conference and seminars

This category contains a large component of commercialized continuing education. The programmes are usually held on a regional, state or national level. They range from one half day to one week in length and may cover a single topic in depth or be broadly comprehensive. They usually use a variety of formats to aid the learning process from self instruction to multi-media.

3. Mass approach-Education of the general public

No health worker or health team can mount an effective health education programme for the whole community, except through mass media of communication. The evolution of the media mass has been rapid. Up till the early 1920s mass communication depended largely on what was printed poster, pamphlets book periodicals and newspapers. Then came the radio and with it a new dimension of experience. TV went a gigantic step further and ahs become a very powerful weapon. The press caters primarily to the eye, the radio appeals to the ear and TV to both eye and ear. A final word about radio and TV they come close to the warmth and motivational effect of a persons to person communication. They have become part of the fabric of modern civilization.

Mass media are a one way communication. They are useful in transmitting message to people even in the remotest places. The number of people who are reached usually count in millions. Their effectiveness can give high return for the time and money involved.

Mass media alone are generally inadequate in changing human behaviour. For effective health commutation, they should be used in combination with other methods. The power of mass media in creating a political will in favour of health, raising the health consciousness of the people, setting norms, delivering technical messages, popularizing health knowledge and fostering community involvement are well recognized. Public health methodologies should be culturally appropriate; they should be carefully through-out before use. A brief account of the mass media is given below:

1. **Television**

Television has become the most popular of all media. It is effective in not only creating awareness, but also to an extent influencing public opinion and introducing new ways of life. It is raising levels of understanding and helping people familiarize with thing they have not seen before including crime and violence which are shown as part of feature programmes. TV is a one way channel. It can only be an aid to teaching. It cannot cover all areas of learning. It has much potential for health communicating.

2. Radio

Radio is found nearly in every home. In many developing countries the radio has a broader audience than TV. Both radio and TV can reach illiterate population not accessible through printed word. It is a purely didatic medium. It can be valuable aid "putting across" useful health information, in the form of starting talks, play question and answers and quiz programmes. Radio is much cheaper than TV. Doctor and health workers may speak out on radio. Local health issues may be identified and discussed leading to increased general awareness.

3. Internet

This new means of computer based communication system has opened vast capacity of transfer of knowledge, ad has made it possible to get into direct and instant communication across the world by means of e-mail and even a on line chat. This is a fast growing communication media and holds very large potential to become a major health education tool. Already a fairly large number of persons in India are using this media, and the numbers are growing everyday. Vast amount of health related literature from WHO and other health agencies is available on line. The health related

information from the ministry of health and family welfare government of India is also available on their website.

4. Newspapers

Newspaper is the most widely disseminated of all forms of literature. New must be newsworthy before it is printed. Whereas many people turn to radio TV for entertainment, news paper readers are often seeking newspapers. Newspapers have limitation of having low readership in rural areas because of literacy. They reach only a limited group, i.e the literates in the community.

5. Printed material

Magazines, pamphlets booklet and hand out have long been in use for health communication. They are aimed at those who can read. Their usefulness is lies in the fact that they can convey detailed formation. They can be produced in bulk for very little cost and can be shared by others in the family and community.

6. Direct mailing

This is a new innovation in health communication in India. The intention is to reach the remote areas of the country with printed word (e.g tolder and newsletters and booklet on family planning, immunization and nutrition etc.). These are sent directly to village leaders, literate person, panchayats and local bodies and others whoa re considered a opinion leaders. Direct mailing ahs been a successful mass medial in creating public awareness. It is possibly the most person of mass communication.

7. Poster, billboards and sings

These are intended to catch the eye and crate awareness. Therefore, the message to be communicated must be simple and artistic. Posters are not expensive when on considers they are seen by a large number of people. Motives such as humor and fear are introduced into posters in order to hold the attention of the public. In places where the posture time is short (e.g streets), the message of the poster should be short, simple, direct and one that can be taken at a glance and easy to understand immediately. In places where people have some time to spend (e.g bus stop, railway stations, hospital health center) the poster can present more information. The right amount of mater should be put up in the right place at the right time. That is when there is an epidemic of viral hepatitis, there should be poster displayed in viral jaundice but on cholera. The life of a poster is usually short posters should be changed frequently otherwise they will lose their effect. As a media of health education, poster have much less effect in changing behaviour than its enthusiastic users would hope.. indiscriminate use of poster by pasting them on walls serves no others useful purpose than covering the wall.

8. Health museums and exhibitions

Is properly organized health museums and exhibitions can attract large number of people. By presenting a variety of ideas, they do increase knowledge and awareness. Photographic panels attracts more personal than graphic panels. This is because photos give a humanized tough to the communication. The three dimensional models were lighted visuals are even more effective than photos.

In exhibitions, there is a big element of personal communication through workers who explain each item on the exhibit. Printed literature explaining he exhibits is often

feely distributed. Health exhibitions and museums thus offer a package of both personal and impersonal methods of communication.

9. Folk media

The term “mass communication” ought to refer to the totality of communication which takes within its compass not only the electronic media, but also folk (or indigenous) media such as keerthan, katha, folk songs, dances and dramas and puppet shows which have roots in our cultures. The Muslims have their own traditional folk forum like the ghazals, the kawali.

The mass media are only “instrument”. As such they are neither good not bad; what maters is the message the carry and the way the message is delivered. There is no single way to do public education. Health education is still art rather than a science. Each community and country should develop techniques that meet its won needs.

PLANNING AND MANAGEMENT

Health education cannot be planned in a vacuum. It is planned in connection with a specific health programme or health services. Therefore, the specifies of a health education strategy in a local community have to be formulated in accordance with its socio-cultural, psycho-social, political, economic and situation characteristics. The planners should be fully conversant with the health education needs of the particular programme of which health education is to be planned.

Health education planning follows the main steps in scientific planning, which are

1. Collecting information on specific problems as seen by the community.
2. Identification of the problem
3. Deciding on priorities
4. Setting goals and measurable objectives
5. Assessment of resources
6. Consideration of possible solutions
7. Preparation of a plan of action

(i) What will be done

(ii) When?

(iii) By whom

8. Implementing the plan
9. Monitoring and evaluating the degree to which stated objectives have been achieved
10. Reassessment of the process of planning. Planning and evaluation are essential for effective health education.

4.0: Conclusion

All health education and health communication work requires continuous evaluation to measure the effectiveness of health education/communication activities in achieving stated objectives and to assess the important on programme performance of such variables and knowledge attitudes, behaviour change and consumer satisfaction.

5.0: Summary

This unit has covered models of health education, contents of health education contents of health education, principles of health education, practice of health education and planning and management of health education.

6.0 : References

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7.0: Tutor Marked Assignment

a. Discuss the Principles of Health Education

b. What are the steps in scientific planning and management of health education?

Unite 3: Health Information and Basic Medical Statistics I

Table of contents

1.0: Introduction.

2.0: Objectives

3.0: Main content

3.1: Introduction

3.2: Sources of health information.

4.0 Conclusion

5.0 Summary

6.0 References

7.0: Tutor Marked Assignment

1.0: INTRODUCTION

This unit 3 commences a services of units on heath information and basic medical statistics. The relevance of health information system can not be order emphasized as it is a general rule that the most successful man in life is that man who has the best information because information is power and a man that is not informed may be deformed so health information system is essential for adequate planning and management of health services. This unit will deal with distraction between data and information regiments to be satisfied y health information

systems, components of health information systems, uses of health information sources of health information.

2.0: OBJECTIVE

At the end of this unit the learners should be able to:

- Define health information system.
- Make distraction between data and information
- List requirement of health information system.
- Enumerate components of a health information system
- Itemize the uses of health information
- Discuss sources of health information

3.0 MAIN CONTENT

3.1: INTRODUCTION

Health information is an internal part of the national health system. It is a basic tool of management and a key input for the progress of any society. A health formation system is defined as:

> "a mechanism for the collection, processing analysis and transmission of information required for organizing and operation health services, and also for research and training".

The primary objective of a health information system is to provided reliable, relevant, up-to-date, adequate, timely and reasonable complete information for health managers at all levels (i.e, central, intermediate and local), and at the sharing of technical and scientific (including bibliographical) information by all health personnel participating in the health services of a country; and also to provide at periodic intervals, data that will show the general performance of the health services and to assist planners in studying their current functioning and trends in demand and work load.

Unfortunately, it is still very difficult to get the information where it matters most – i.e., at the community level. It is conceded that no country at the present time has such a thoughtfully constructed system of health information in operation, but the concept is receiving much attention. The whole science of health statistics has undergone considerable changes in the past two decades in 1973; the World Health Assemble stressed the need for complete reconstruction of the health information systems.

3.1.1 DISTINCTION BETWEEN DATA AND INFORMATION

There is more than a subtle semantic difference between "data", "information; and "intelligence;. Data consist of discrete observations of attributes or events that carry little meaning when considered alone; data as collected from

operating health care systems or institutions are inadequate for planning. Data need to be transformed into information by reducing them, summarizing them and adjusting them for variations, such as the age and sex composition of the population so that comparisons over time and lace are possible. It is the transformation for information through integrating and processing with experience and perceptions based on social and political values that produce intelligence

Data that are not transformed into information, and information that is not transformed into intelligence to guide decision-maskers, policy makers, planners, administrators and health car personnel themselves, are of little value.

3.1.2 Requirements to be satisfied by health information systems

A WHO Expert Committee identified the following requirements to be satisfied by the health information systems:

(1) The system should be population-based

(2) The system should avoid the unnecessary agglomeration of data

(3) The system should be problem-oriented

(4) The system should employ functional and operational terms (e.g., episodes of illness treatment regimens, laboratory tests)

(5) The system should express information briefly and imaginatively (e.g., tables, charts, percentages)

(6) The system should make provision for the feedback of data

3.1.3 Components of a health information system.

The health information system is composed of several related subsystems. A comprehensive health information system requires information and indicators on the following subjects.

(1) demography and vital events

(2) environmental health statistics

(3) health status: mortality, morbidity, disability, and quality of life

(4) health resources: facilities, beds manpower

(5) utilization and no-utilization of health attendance, admissions, waiting lists

(6) indices of outcome of medical care

(7) financial statistics (cost, expenditure) related to the particular objective

3.1.4: Uses of health information

The important uses to which health information may be applied are:

(1) To measure the health status of the people and to quantify their health problems and medical and health care needs

(2) For local, national and international comparisons of health status. For such comparisons the data need to be subjected to rigorous standardization and quality control.

(3) For planning, administration and effective management of health services and programmes

(4) for assessing whether health services are accomplishing their objectives in terms of their effectiveness and efficiency

(5) For assessing the attitudes and degree of satisfaction of the beneficiaries with the health system, and

(6) For research into problem of health and disease.

3.2. Sources of health information

The life blood of a health information system is the routine health statistics. Information requirements will vary according to the administrative level at which planning is envisaged. For example, the information requirements of a public health administrator will be different from the information requirements of a hospital administrator. These different contexts require different sources of information. These are discussed in this section.

1. **Census**

   The census is important source health information. It is taken in most countries of the world at intervals, usually of 10 years. A census is defined by the United Nations as " the total process of collecting, compiling and publishing demographic, economic and social data pertaing at a specified time or time to all person in a country or delimited territory". Census is a

massive undertaking to contact every member of the population in a given time and collect a variety of information. It needs considerable organization, a vast preparation and several years to analyses the results. These results are usually not available quickly.

The first regular census in India was taken in 1881, and others took place at 10-year intervals. The last census was held in March 2001. The census is usually conducted at the end of the first quarter of the first year in each decade, the reason being, most people are usually resident in their own home during that period. The legal basis of the census is provided by the Census Act of 1948. the supreme officer who directs, guides and operates the census is the Census Commissioner for India.

Although the primary function of census is to provide demographic information such as to total count of population and its breakdown into groups and subgroups such as age and sex distribution, it represent only a small part of the total information collected. The census contains a mine of information on subjects not only demographic, but also social and economic characteristics of the people, the conditional under which they live, how they work, their income and other basic line for planning, action and research not only in the filed of medicine, human ecology and social sciences but in the entire governmental system. Population census provide basic data (such as

population by age and sex) needed to compute vital economic indicators. Without census data, it is not possible to obtain quantified health, demographic and socio-economic indicators.

2. **Registration of vital events**

Whereas census is an intermittent counting of population, registration of vial events (e.g., births, deaths) keeps a continuous cheek demographic change. If registration of vial events is complete and accurate, it can serve as a reliable source of health information. Much importance is therefore given to the registration of vial events in all countries. It is the precursor of health statistics. Over the years, it has dominated the health information system.

The United Nations defines a vital events registration system as including "legal registration, statistical recording and reporting of the occurrence of, and the collection, compilation, presentation, analysis and distribution of statistics pertaining to vital events, i. e., live births, deaths, foetal deaths, marriages, divorces, adoptions, limitations, recognitions, annulments and legal separations". Registration of vital events has been the foundation of vital statistics.

India has a long tradition of registration of births and deaths. In 1873, the Government, of India had passed the Births, Deaths and Marriages Registration Act, but the Act provided only for voluntary registration.

Subsequently, individual States like Tamil Nadu, Karnataka and Assam passed their own Acts. However, the Registration system in India tended to be very unreliable, the data being grossly deficient in regard to accuracy, timelines, completeness and coverage. The extent of under-registration in some States ranged from 38 to 97 per cent in respect of births, and 3to 83 per cent in case of deaths. This is because of illiteracy, ignorance, lack of concern and motivation. There are also other reasons and transmission of data which is different for rural and urben areas, and multiple registration agencies (e.g., health agency, panchayat agency, police, agency and revenue agency).

The Central Births and Deaths Registration Act, 1969

In an effort to improve the civil registrarfion system, the Government, of India promulgated the Central Births and Deaths Registration Act in 1969. The Act came into force on 1 April 1970. The Act provides for compulsory registration of births and deaths throughout the country, and compilation of vital statistics in the States so as to ensure uniformity and comparability of data. The implementation of the Act required adoption of rules for which also, model guidelines have been provided. The Act also fixes the responsibility for reporting births and deaths. While the public

(e.g.,. parents, relatives) are to report events occurring in their households, the heads of hospitals, nursing homes, hotels, jails or harmashalas are of report events occurring in such institutions to the concerning Registrar. The time limit for registration the events of births is 14 days and that of deaths 7 days. In case of default a fine up to Rs. 50 can be imposed. The Act makes the beginning of a new era in the history of vital statistics registration in India.

Lay Reporting

Because of slow progress in the development of a comprehensive vital registration system,, some countries have attempted to employ first- line health workers (e.g., village health guides) to record births and deaths in the community. Indeed, one of the important functions of a primary health worker is to collect and record data on vital events and other health information in his or her community.

In order to obtain this information, a new approach has been developed in several countries. This approach is known as “lay reporting of health information “. Lay reporting is defined as the collection of information, its use, and its transmission to other levels of the health system by non-professional health workers

In large majority of countries properly functioning vital events registers do not exist and it is necessary to resort to demographic surveys, etc. as an alternative source. The demographic survey, however, can never lead to the desired goal of complete recording of all vital events in a country. Thus, where a vital events registration system is not functioning, the demographic survey should be regarded as a temporary substitute rather than a replacement.

3. **Sample Registration System (SRS)**

Since civil registration is deficient in India, a Sample Registration System (SRS) was initiated in the mid-1969s to provide reliable estimates of birth and death rates at the National and State levels. The SRS is a dual-record system, consisting of continuous enumeration of birth and deaths by an enumerator and an independent survey every 6 months by an investigator-supervisor. The half-yearly survey, in addition to serving as an independent check on the events recorded by the enumerator, produces the denominator required for computing rates.

4. **Notification of diseases**

Historically notification of infectious diseases was the first health, information sub-system to be established. The primary purpose of

notification is to effect prevention and/ or control the disease. Notification is also a valuable source of morbidity data i.e., the incidence and distribution of certain specified diseases which are notifiable.

Lists of notifitable diseases very from country to country, and also within the same country between the States and between urban and rural areas. Usually diseases which rare considered to be serious menaces to public health are included in the list of notifiable diseases. Notification system is usually operative through certain legal Acts (e.g., Madras Public Health Act, 1930). Some State Governments in India do not have any specific Act, except invoking the Epidemic Diseases Act of 1897, and extending the same from year to year. The notification system is linked up with the vital statistics machinery and the reporter is often the village chowkidar or headman. With the introduction of village Health Guides and multipurpose workers, the reporting responsibility is now shifted from the village chowkidar to the health workers. Since the legal provision is an essential per-requisite for any notification system, the enactment of a uniform Act similar to the Registration of Births and deaths Act, 1969 is deemed necessary for any improvement in the notification system in India.

At the international level, the following diseases are notifiable to WHO in Geneva under the International Health Registrations (IHR), viz, cholera, plague and yellow fever. A few other-louse-born typhus, relapsing fever, polio, influenza, malaria,

rabies and salmonellos are subject to international surveillance. This information is published by WHO on a world-wide basis. The Expert Committee on Health Statistics in its third Report recommended that yearly data of notification should be detailed by age and sex.

Although notification is an important source of health information, it is common knowledge that it suffers from serious limitations: (a) notification covers only a small part of the total sickness in the community (b) the system suffers from a good deal of under-reporting (c) many cases especially atypical and subclinical cases escape notification due to no-recognition, e.g., rubella, non-paralytic polio, etc. the accuracy of diagnosis and thereby of notification depends upon the availability of facilities for bacteriological, virological and serological examination. The lack of such facilities in the rural areas of India also works against the correct reporting of the causes of sickness.

In spite of the above limitations, notification provides valuable information about new occurrences or outbreaks of disease. The concept of notification has been extended to many non-communicable diseases and conditions notable cancer, congenital malformations, mental illness, stroke and handicapped persons.

5. **Hospital records**

   In a country like India, where registration of vital events is defective and notification of infectious disease extremely inadequate, hospital data

constitute a basic primary source of information about diseases prevalent in the community. The eighth report of the WHO Expert Committee on Statistics recommended that hospital be regarded in all countries as an integral and basic part of the nation statistical programme.

The main drawbacks of hospital data are: (a) they constitute only the "tip of the iceberg" -ie., they provide information on only those patients who seek medical care, but not on a representative sample of the population. Milld cases may no attend hospital: subclinecal cases are always missed

(b) the admission policy may very from hospital the hospital; therefore hospital statistics tend to be highly selective

(c) Population served by a hospital (population at risk) cannot be defined. There are no precise boundaries to the catchments area of a hospital. In effect, hospital statistics provide only the numerator (i.e., the cases), not the denominator. Extrapolation of hospital data to an entire community is highly conjectural in estimating frequency rates of disease. Therefore, hospital statistics are considered a poor guide to the estimation of disease frequency in a community.

In spite of the above limitations, a lot of useful information about health care activities and utilization can be derived from hospital records. For example, hospital discharge sheets contain much useful information on diagnosis,

medical and surgical procedures, complications, length of stay, laboratory data, etc. a study of hospital data provides information on the following aspects: (a) geographic sources of patients (b) age and sex distribution of different diseases and duration of hospital stay (c) distribution of diagnosis (d) association between different diseases (e) the period between diseases and hospital admission (f) the distribution of patients according to different social and biological characteristics, and (g) the cost of hospital care. Such information may be of great value in the planning of health care services. Indices such as bed-occupancy rates, duration of stay, cost-effectiveness of treatment policies are useful in monitoring the use of hospital facilities. For the development of hospital statistics, the importance of establishing a medical record department in each hospital cannot be overemphasised. It is now felt that computerization of medical record will enable medical care to be more effectively rendered, better planned, and better evaluated.

6. Diseases registers

The term "registration" implies something more then "notification". A register requires that a permanent record be established, that the cases be followed up, and basic statistics tabulations be prepared both on frequency and on survival. In addition, the patients on a register should frequently be the subjects of special studies.

Morbidity registers exist only for certain diseases and conditions such as stroke, myocardial infarction, cancer, blindness, congenital defects and congenital rubella. Tuberculosis and leprosy are also registered in many countries where they are common.

Morbidity register are a valuable source of information as to the duration of illness, case fatality and survival. These registers allow follow – up of patients and provide a continuous account of the frequency of diseases in the community. Even in the absence of a defined population base, useful information may be obtained from registers on the natural course of diseases, especially chronic diseases in different parts of the world. If the reporting system is effective and the coverage is on a national or representative basis, the register can provide useful data on morbidity from the particular diseases, treatment given and diseases-specific mortality.

7. Record linkage

The term **record linkage** is used to describe the process of bringing together records relating to one individual (or to one family), the records originating in different times or places. The term **medical record linkage** implies the assembly and maintenance foe each individual in a population, of a file of the more important records relating to his health. The events commonly recorded are birth, marriage, death, hospital admission and discharge. Other

useful data might also be included such as sickness absence from work, prophylactic procedures, use of social services, etc. Record linkage is a particularly suitable method of studying associations between diseases; these associations may have a etiological significance.

The main problem with record linkage is the volume of data that can accumulate. Therefore in practice record linkage has been applied only on a limited scale e.g., twin studies, measurement of morbidity, chronic diseases epidemiology and family and genetic studies. At the moment, record linkage is beyond the reach of many developing countries.

8. **Epidemiological surveillance**

In many countries, where particular diseases are endemic, special control / eradication programmes have been instituted, as for example national diseases control programmes against malaria, tuberculosis, leprosy, filariasis, etc. As part of these programmes, surveillance systems are often set up (e.g., malaria) to report on the occurrence of new cases and on efforts to control the diseases (e.g., immunizations performed). These programmes have yielded considerable morbidity and mortality data for the specific diseases.

9. **Other health service records**

A lot of information is also found in the records of hospital out-patient departments, primary health centres and subcentres, polyclinics, private practitioners, mother and child health centres, school health records, diabetic and hypertensive clinics, etc. For example, record MCH centres provide information about birth weight, height, arm circumference, immunization, diseases specific mortality and morbidity. However, the drawback with this kind of data is that it relates only to a certain segment of the general population. Further the data generated by these records are mostly kept for administrative purposes rather than for monitoring.

10. Environmental health data

Another area in which information is generally lacking is that relating to the environment. Health statistic are now sought to provide data on various aspects of air, water and noise pollution; harmful food additives; industrial toxicants inadequate water disposal and other aspects of the combination of population explosion with increased production and consumption of material goods. Environmental data can be helpful in the identification and quantification of factor causative of disease. Collection of environmental data remains a major problem for the future.

11. Health manpower statistics

Information on health manpower is by no means least in importance. Such information relates to the number of physicians (b) age, sex, specialty and place of work), dentists (classified in the same way), pharmacists, veterinarians, hospital nurses, medical technicians, etc. Their records are maintained by the State medical/.dental/nursing councils and the Directorates of Medical Education. The census also provides information about occupation. Institute of Applied Manpower Research attempts estimates of manpower, taking into account different sources of data, mortality and out-turn of qualified persons from the different institutions. The planning Commission also gives estimates of active doctors for different States. Regarding medical education, statistics of numbers admitted, numbers qualified, are given every year in “, published by the Government, of India, in the Ministry of health &family Welfare.

12. Population surveys

A health information system should be population-based. The routine statistical collected from the above sources do not provide all the information about health and disease in the community. This call for population surveys to supplement the routinely collected statistics. The importance of surveys is heightened by the fact that there are no cause-of death statistics in India and the statistics available for cholera, plague, respiratory diseases, fevers and diarrhea of no use for public health administration.

The term “health surveys” is used for surveys relating to any aspect of health-morbidity, mortality, nutritional status, etc. when the main variable to be studied is disease suffered by the people, the surveys is referred to as “morbidity surveys”. Broadly, the following types of surveys would be covered under health surveys:

(a) Surveys for evaluating the health status of as population, that is community diagnosis of problems of health and disease,. It is information about the distribution of these problems over time and space that provide the fundamental basis for planning and developing needed services.

(b) Surveys for investigation of factors affecting health and disease, e.g., environment, occupation, income, circumstances associated with the ones of illness, etc. These surveys are helpful for studying the natural history of diseases, and obtaining more information about disease antilogy and risk factors; and

(c) Surveys relating to administration of health services, e.g., use of health services, expenditure on health, evaluation of population health needs and unmet needs, evaluation of medical care, etc.

Population surveys can be conducted in almost any setting; sampling techniques have been developed so that estimates at any level of precision desired within the constraints of available resources can be achieved. Health surveys may be cross-sectional or longitudinal; descriptive or analytic or both. Health surveys on a permanent basis are in operation in only a few countries, viz, in Japan since 1953, USA since 1957 and UK since 1971. General health surveys on a national basis have not yet been attempted in India, although the first methodological general health surveys was carried out in Singur Health Centre by Lal and Seal in 1944-46.

Surveys methods

From the point of view of the method employed for data collection, health surveys can be broadly classified into 4 types:

a. Health interview (face- to face) surveys
b. Health examination surveys
c. Health records surveys
d. Mailed questionnaire surveys

Each method has its advantages and disadvantages. When information about morbidity is needed, health examination surveys generally provide more valid information then health interview surveys. The survey is carried out by teams consisting of doctors, technicians and interviewers. The main disadvantage of a health examination surveys is that it is expensive and cannot be carried out on an extensive scale. The method also requires consideration of providing treatment to people fond suffering from certain diseases. The health interview (face-to-face) surveys is an invaluable method of measuring subjective phenomena such as perceived morbidity, disability and impairment; economic loss due to illness, expenditure incurred on medical care; opinions, belief and attitudes; and some behavioral characteristics. It also the advantage of giving

population based data. The National Sample Surveys Organization in India has been active in conducting interview data, but the morbidity data is not reliable because of the limitation of the interview method. This is why interview s are often combined with health examination surveys and/or laboratory measurements. An alternative method of measuring subjective phenomena is the self-administered Questionnaire, i.e., a questionnaire without an interview. The use of questionnaires is simpler and cheaper, and they may be sent, for example, by mail to people sampled from a given target population. A certain level of education and skill is expected from the respondents when a questionnaire is administered. There is usually a high rate of non-response. Health records surveys involves collection of data from health surveys records. This is obviously the cheapest method of collecting data. This method has several disadvantages: (a) the estimates obtained from the records are not population-based (b) reliability of data is open to question, and (c) lack of uniform procedures and standardization in the recording of data.

Unless the aim of surveys is to derive information from a special group (e.g., school children or a particular occupational

group), the household is the most common sampling unit. It is one that allows for the collection of most social, economic and health information in a convenient way.

The size of the sample, necessary for a household surveys, depends upon the measurement being taken and the degree of precision needed. Many national samples typically cover between 5,000 to 10,000 households. This is usually considered adequate for providing national estimates on such variables as health care status, anthropometric measurements, and food consumption income, expenditure, housing, literacy, etc.

Surveys carried out by either single or repeat visits provide direct estimates of vital events. A single survey obtains the necessary information retrospectively and is subject to problems of recall and omission. Follow-up surveys on the same household within short intervals (e.g., 6 months) appear to provide more accurate estimates of vital events, but may be too expensive for monitoring purposes.

Data must be gathered under standardized conditions with quality control. The collection of data should be limited to those items for which there is a clearly defined use or need; the fact that data might be of interest or use to someone, someday, somewhere is not a valid reason for

collecting them. The data that is collected should be transformed into information by reducing them, summarizing them and adjusting them for variations in the age and sex composition of the population so that comparisons over time and place are possible.

13. Other routine statistics related to health

The following list, which is not comprehensive, merely serves to give examples of sources of data that have already been put to good use by epidemiologists:

(1) Demographic: In addition to routine census data statistics on such other demographic phenomena as population density, movement and educational level.

(2) Economic: consumption of such consumer goods as to oacco, dietary fats and domestic coal; sales of drugs and remedies; information concerning per capita income; employment and unemployment data.

(3) Social security schemes: medical insurance schemes make it possible to study the occurrence of illnesses in the insured population. Other useful comprise sickness at sense, sickness and disability benefit rate.

(4) Non-quantifiable information

Hitherto, the health information system concentrated manly on quantifiable (statistical) data. Health planners and decision makers require a lot of no-quantifiable information, for instance, information on health policies, health legislation, public attitudes, programme costs, procedures and technology. In other words, a health information system has multi-disciplinary inputs. There should be proper **storage, processing** and **dissemination** of information.

4.0 Conclusion

The main purpose of health information is to provide reliable, relevant, up to date, adequate, timely an reasonably complete information for health managers at all levels and at the sharing of technical and scientific information by all health personnel participating in the health services of a nation.

5.0 Summary

You have gone through the introductory part of the series in health information and basic medical statistics especially the meaning and components of a health information system uses of health information, sources of health information and source of health information. It is my hope that his unit has increased your knowledge on health information system.

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7.0 Tutor Marked Assignment

Describe the source of health information in Nigeria.

Unite 4: Health Information and Basic Medical Statistics II: Elementary Statistical Methods

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7.0: Tutor Marked Assignment

1.0 Introduction

This is the second part of the series of health information and basic medical statistical which is unit 4. This unit will look into the elementary statistical methods and hoe statistical data are presented such as tabulation, charts and diagrams, statistical maps, statistical averages measures of dispersion and normal distribution. I wish you good understanding of the unit.

2.0 Objectives

At the end of this unit the learners should be able to

- explain tabulation as a measure of data presentation
- Discuss chart and diagrams.
- Described statistical maps and average.
- Explain measures of dispersion and normal distribution of data presentation.

3.0 Main Content

EMENTARY STATISTICAL METHODS

In any field of inquiry or investigation, data is first obtained which is subsequently classified, analysed and tested for accuracy by statistical methods. Data that is directly from an individual is called primary data. The census of 1991 is an example of collecting primary relating to the population. The collection of data about the health and sickness of a population is primary data. Data the is obtained from outside source is called secondary data. If we are the census data become secondary data. Primary data gives the precise information wanted which the secondary data may not give.

Presentation of Statistical Data

Statistical data, one collected, must be arranged purposively, in order to bring out the important points clearly and strikingly. Therefore the manner in which statistical data is presented is of utmost importance. There are several methods of presenting data – tables, charts, diagrams, graphs, pictures and special curves. A brief description of these methods is given below:

3.1. TABULATION

Tables are devices for presenting data simply from masses of statistical data. Tabulation is the first step before the data is used for analysis or interpretation. A table can be simple or complex, depending upon the number of measurement of a single set or multiple sets of items. Whether simple or complex, there are certain general principles which should be borne in mind in designing table: (a) The tables should be numbered (b) A title must be given to each table. The title must be brief and self-explanatory, (c) The heading of columns or rows should be clear and concise, (d) The data must be presented according to size or importance; chronologically or geographically, (e) If percentages or averages are to be compared, they should be placed as close as possible, (f) No table should be too large, (g) Most people find a vertical arrangement better then a horizontal one because, it is easier to scan the data from top to bottom then from left to right, (h) Food notes or additional information. Some examples of tabulation are below:

3.2 Charts and Diagram

Charts and diagrams are useful methods of presenting simple statistical data. They have a powerful impact on the imagination of people. Therefore, they are a

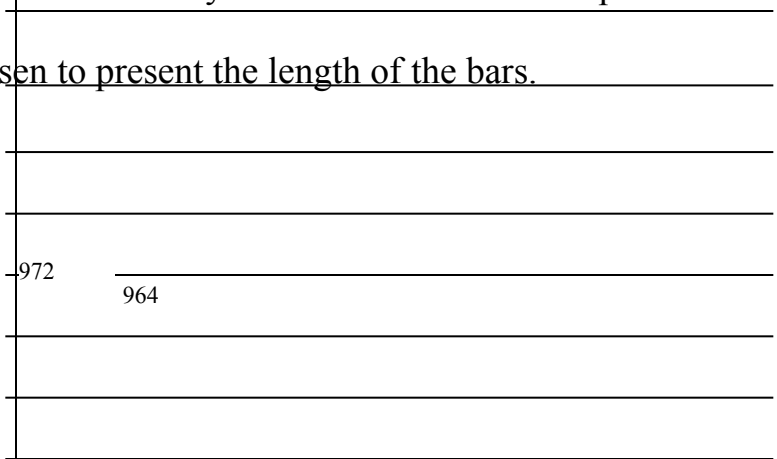
popular media of expressing statistics data, especially in newspapers and drawn a few general marks need be mentioned about charts and diagrams are better retained in the memory than statistical tables. The data that is to be presented by reader will misunderstand. However, simplicity may be obtained only at the expenses of details and accuracy. THAT IS, LOT OF details of the original data may be lost in the charts and diagrams. If we want the real study, we have to go back to the original data.

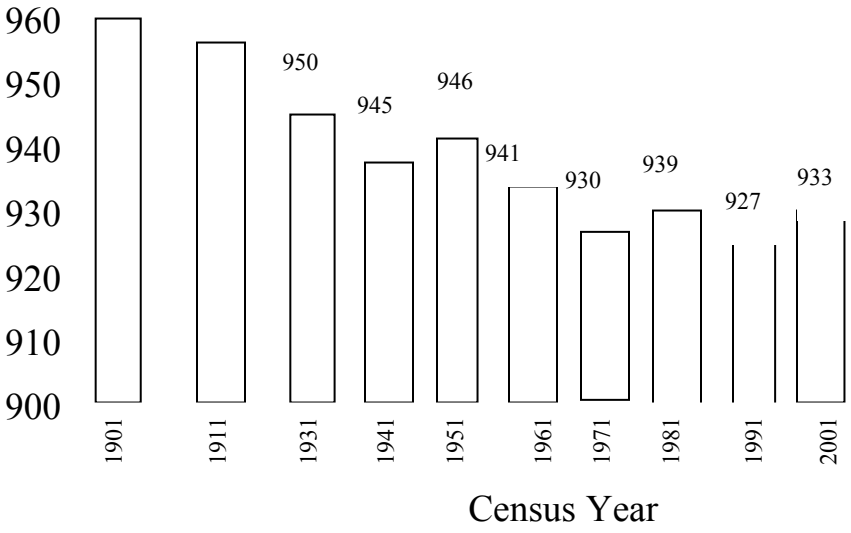
1. **Bar Charts**

Bar charts are merely a way of presenting a set numbers by the magnitude of a bar-the length of the bar is proportional to the magnitude to be represented. Bar charts are a popular media of presenting statistical data because they are easy to prepare, and enable values to be compared visually. The following are some examples of bar charts.

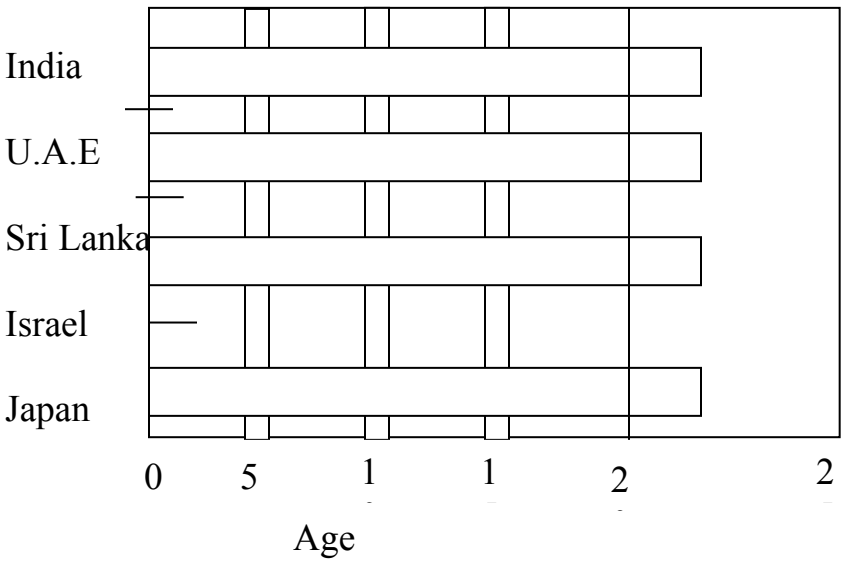
a. Simple bar chart

Bar may be vertical or horizontal. The bars are usually separated by appropriate spaces with an eye to neatness and clear presentation. A suitable scale must be chosen to present the length of the bars.



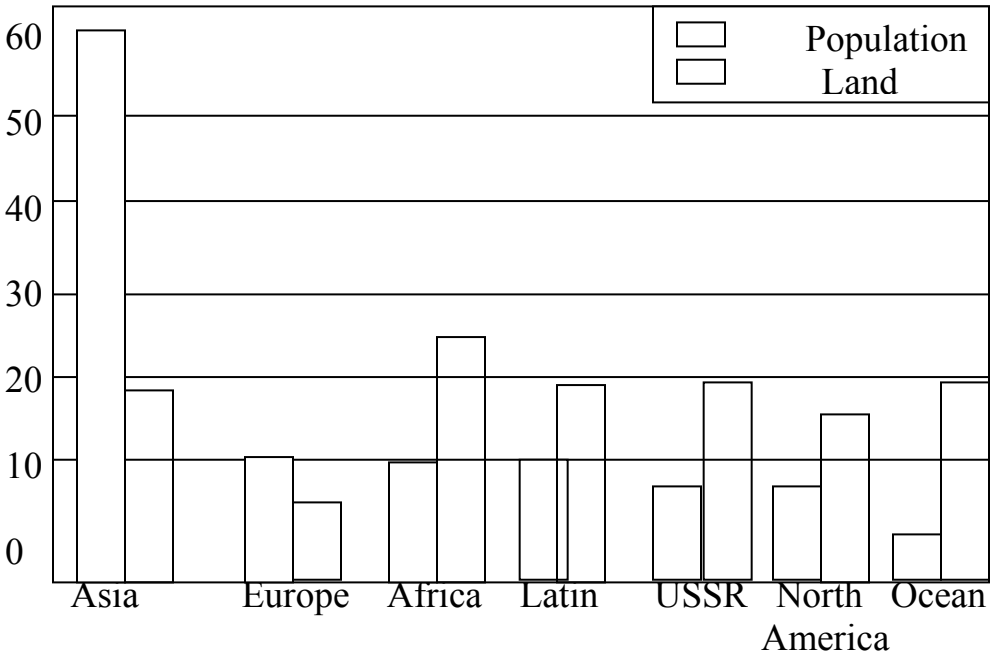


India; sex Ratio 1901-2001.



Mean age at marriage (females) in some countries.

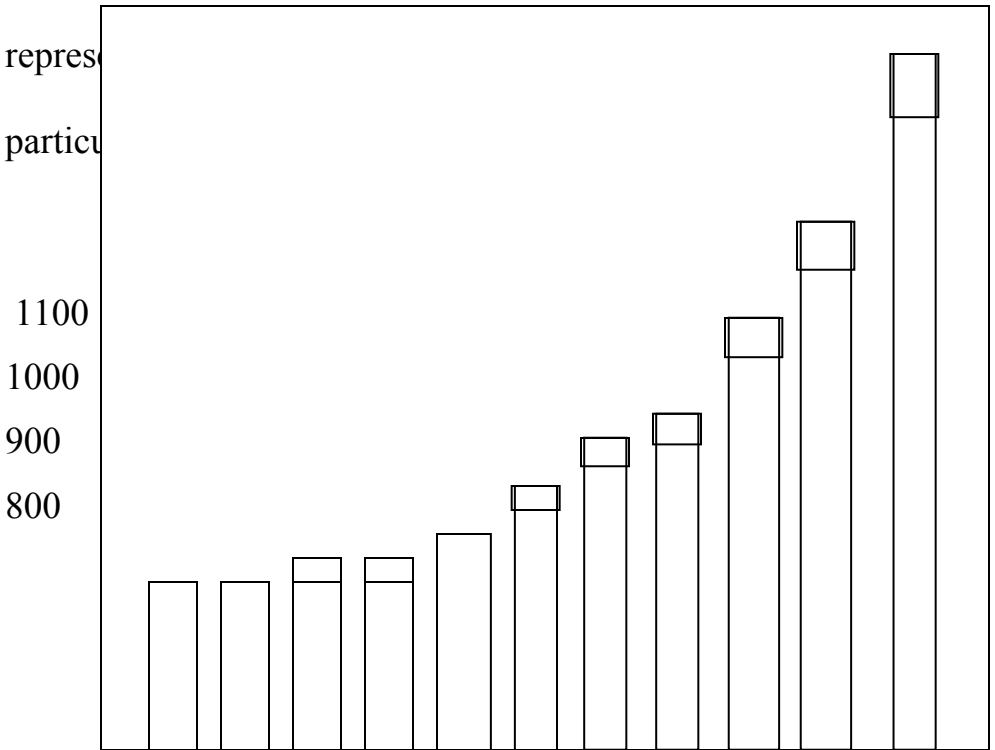
Multiple Bar Chart or a compound bar chart. Two or more bars can be grouped together.Population and land area by region are compared.



Population and land area by region

c. Component of Bar Chart

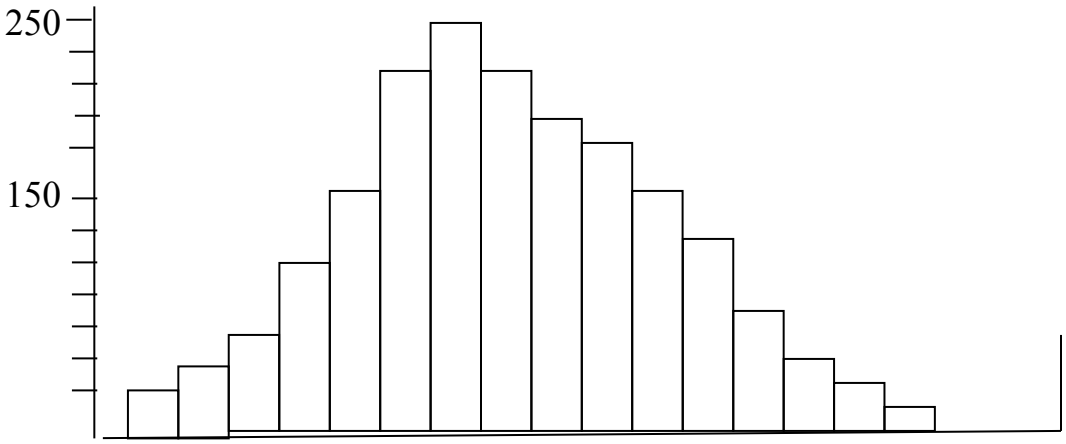
The bars may be divided into two or more part each parts repres of that particu



India: Growth of population 1901 to 2001

2. Histogram

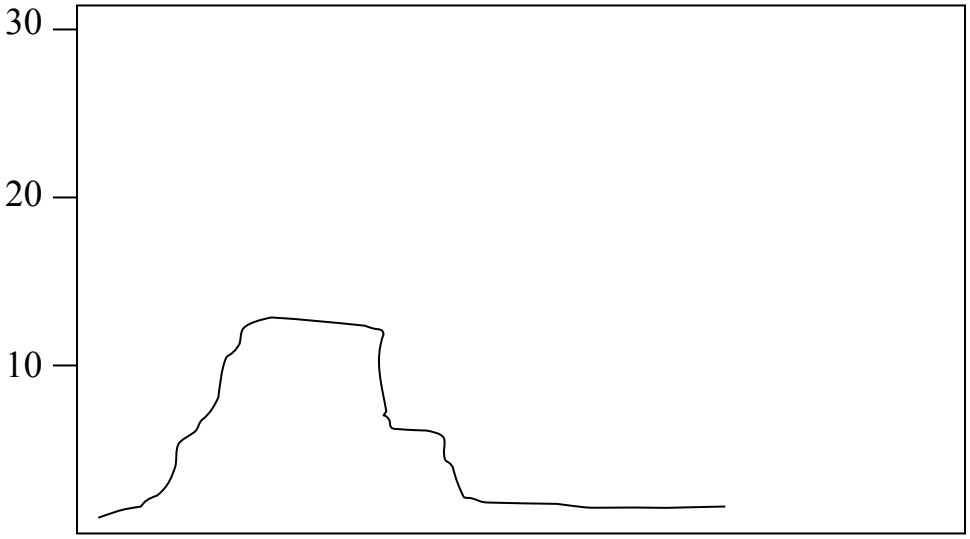
It is a pictorial diagram of frequency distribution. It consists of a series of blocks. The class intervals are given along the horizontal axis and the frequencies along the vertical axis. There are of each block or rectangle is proportional to the frequency. Below is the histogram of the frequency distribution of pressure in females 45-46 years.



frequency distribution of diastolic blood pressure in female aged 45-64 years.

Frequency polygon

A frequency distribution may also be represented diagrammatically by the frequency polygon. It is obtained by joining the mid-points of the histogram block is the frequency polygon of the distribution if reading of symbolic blood pressure in a community.



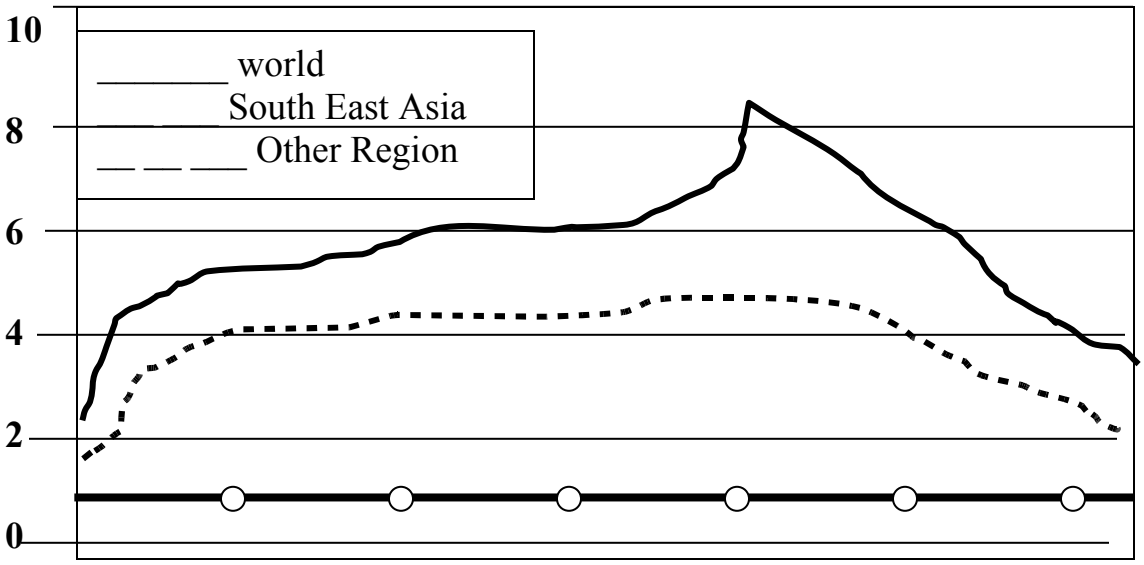
0 –

90 110 130 150 170 190 210 230 250

Frequency distribution of readings of symbolic blood pressure

Line Diagram

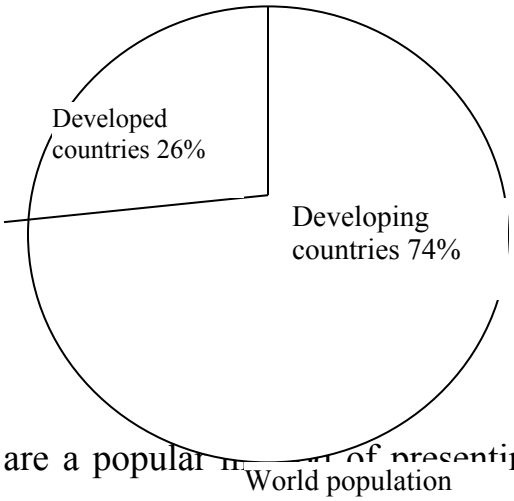
Line diagrams are used to show the trend of events with the passage of time. The following is an example of a line diagram showing the trend of malaria cases reported throughout the world (excluding the African Region) during 1972-78.



Malaria cases reported, 1971-1978 (excluding African Region)

3. Pie charts

Instead of comparing the length of a bar, the areas of segments of a circle are compared. The area of each segment depends upon the angle. Pie charts are extremely popular with the laity, but not with statisticians who consider them inferior to bar charts. It is often necessary to indicate the percentages in the segments. As it may not be sometimes very easy, virtually, to compare the areas of segments.



World population

4. Pictogram

Pictogram are a popular method of presenting data to demand the descript and those who cannot understand orthodox charts. Small pictures or symbols are used to present the data for example, a picture to represent the population per physicians. Fractions of the picture can be used to represent numbers smaller than the value of whole symbol. In essence, pictograms are a form of bar charts.

3.3 STATISTICAL MAPS

When statistical data refer to geographic or administrative areas, it is presented either as “Shaded Maps” or “Dot maps” according to suitability. The shaded maps are used to present data of varying size. The areas are shaded with

different colours, or different intensities of the same colour, which is indicated in the key.

3.4. STATISTICAL AVERAGES

The word “average” implies a value in the distribution, around which the other values are distributed. It gives a mental picture of the central value. There are several kinds of averages, of which the commonly used are: - (1) The Arithmetic Mean< (2) Median and (3) The Mode.

The Mean

The arithmetic mean is widely used in statistical calculation. It is sometimes simply called Mean. To obtain the mean, the individual observations are first added together, and then divided by the number of observations. The operation of adding together is called ‘summations’ and is denoted by the sign and the mean is denoted by the sign x (called “X bar”).

The mean (x) is calculated thus: the diastolic blood pressure of 10 individuals was 83, 75, 81, 71, 95, 75, 77, 84, 90. The total was 810. the mean is 810 divided by 10 which is 81.0. The advantages of the mean are that it is easy to calculate and understand. The disadvantages are that sometimes it may be unduly influenced by abnormal values in the distribution. Sometimes it may even look ridiculous; for instance, the average number of children born to a woman in a certain place was

found to be 4.76, which never occurs in reality. Nevertheless, the arithmetic mean is by far the most useful of the statistical averages.

The Median

The median is an average of a different kind, which dose not depends upon the total and number of items. To obtain the median, the data is first arranged in an ascending of descending order of magnitude, and then the value of the middle observation is located, which is called the median. For example, the diastolic blood pressure of 9 individuals was as follows

The median is 79, which is the value of the middle

Diastolic Blood pressure
83
75
81
79
71
95
75

FIG. 1
Data unarranged

Diastolic Blood pressure
71
75
75
77
79
median
81

FIG. 2
Data unarranged

If there are 10 values instead of 9, the median is worked out by taking the average of the two middle values. That is, if the number of items or values is even, the practice is to take the average of the middle values. For example, the diastolic blood pressure of 10 individuals as in above.

In the example given, the median will be 79 +81 divided by 2 which is

Diastolic Blood pressure
83
75
81
79
71
95
75

Data unarranged

Diastolic Blood pressure
71
75
75
77
79
median
81

Data arranged in order of measurement

The relative merits of median and mean may be examined from the following example: The income of 17 people per day in Rupees was as follows:

5, 5,5, 7, 10, 20, 102 = (Total 154)

The mean is 154 divided by 7 which is 22: the media is 7 which is the value of the middle observation. In this example, the income of the seventh individual (102) has seriously affected the mean, whereas it has not affected the median. In an example of this kind median is more nearer the truth, and therefore more representative than the mean.

The mode

The mode is the commonly occurring value in a distribution of data. It is the most frequent items or the most fashionable value in a series of observations. For example the diastolic blood pressure of 20 individual was:

85, 75, 81, 79, 71, 95, 75, 77, 75, 90

71, 75, 79, 95, 75, 77, 84, 75, 81, 75.

The mode or the most frequent occurring value is 75. The advantages of modes are that it is easy to understand, and is not affected by the extreme items. The disadvantages are that the exact location is often uncertain and is often not clearly defined. Therefore, mode is not often used in biological or medical statistics.

3.5 MEASURES OF DISPERSION

The daily calorie requirement of a normal adult doing sedentary work is laid down as 2,400 calories this clearly is not universally true.

There must be individual variations. If we examine the data of blood pressure or height of weight of a large group of individuals, we will find that the values vary from person to persons. Even within the same subject, there may be variation from time. The questions that arise are: what is normal variation? And how to measure the variation?

There are several measures of variation (or "dispersion" as it is technically called) of which the following are widely known;

a. The range
b. The mean or average deviation
c. The standard deviation

a. The range

The range is by far the simplest measure of dispersion. It is defined as the different between the highest and lowest figures in a given sample. For example form the following record of diastolic blood pressure of 10 individual

83, 75, 81, 79, 71, 90, 75, 77, 94

It can be seen that the highest value was 95 and the lowest 71. The range is expressed as 71 to 95 or by the actual difference (24). If we have grouped data, the range is taken as the difference between the mid-points of the extreme categories. The range is not of much practical importance, because it indicates only the extreme values between the two values and nothing about the dispersion of value between the two extreme values.

b. The Mean Deviation

It is the average of the deviation from the arithmetic mean. It is given y the formula:

$$M.D = \frac{\sum (x-x)}{\eta}$$

Example: The diastolic blood pressure of 10 individuals was as follows: 83, 75, 81, 79, 71, 95, 77, 84, and 90

Diastolic B.P	Arithmetic from	Deviation the mean
x	x	(x - x)
83	81	2
75	81	-6
81	81	0
79	81	-2
71	81	-10
95	81	14
75	81	-6
77	81	-4
84	81	3
90	81	9

Diastolic B.P	Arithmetic from	Deviation the mean
x	x	(x - x)
83	2	4
75	-6	36
81	0	-
79	-2	4
71	-10	100
95	14	196
75	-6	36
77	-4	16
84	3	9
90	9	81
$x = 81 = 10$		Total =482

Mean $\frac{810}{10} = 81$

c. The standard deviation

The standard deviation is the most frequently used measure of deviation. In simple terms, it is defined as "Root-means square deviation." it is denoted by the Greek letter sigma or by initial S.D the standard Deviation is calculated from the basic formula:

$$S.D \sqrt{\frac{\sum (x-x)}{\eta}}$$

When the sample size is more than 30, the above basic formula may be used without modification. For smaller samples, the above formula tends to underestimate the standard deviation, and therefore needs correction, which is done by substituting the denomination (n-1) for π. The modified formulae is as follows:

S.D $\sqrt{\frac{\sum (x-x)^2}{\eta}}$

The steps involved n calculating the standard deviation area s follows:

a. First of all, take the deviation of each value from the arithmetic mean, (x - x).

b. Then, square each deviation $(x-x)^2$

c. Add up the squared deviations

$\sum (x-x)^2$

d. Divide the result by the number of observation π (or π-1) in case the sample size is les than 30).

e. Then take the square root, which gives the standard deviation.

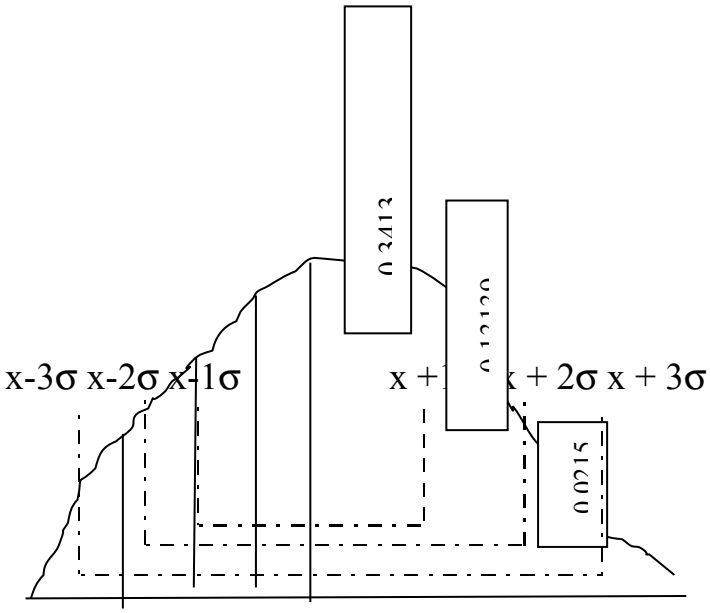
The meaning of standard deviation can only be appreciated fully when we study it with reference to what is described as normal curve. For the present, we may content with the basic significance of significance of standard deviation-that it is an dispersion; that the larger the standard deviation, the greater the dispersion o values about the mean.

3.6 NORMAL DISTRIBUTION

The normal distribution or normal curve is an important concept in statistical theory. Let us suppose we collect the haemoglobin value of a very large number of people ad make frequency distribution with narrow class intervals, we are likely to get a smooth symmetrical curve. Such a curve is called a normal distribution or normal curve the shape of the curve will depend upon the number and nature of observation. It follows, therefore, there will be an infinite number of normal curves.

It is useful to note at this stage that a normal curve (fig 15) the area between one standard deviation on either side of the mean ($x +1 \sigma$) will include approximately 68 per cent of the values in the distribution, the area between two standard deviations on either side of the mean ($x +2 \sigma$) will cover most of the value i.e approximately 95 per cent of the values and c. the area between ($x +3 \sigma$) will include 99.7 per cent of the values. These limits on either side of mean are called "confidence limits" and area as shown below.

Supposing we are considering the 95 per cent confidence limit s ($x +2 \sigma$) when we say this, we mean that 95 per cent of the area of the normal curve, and hence 95 per cent of the values in the distribution will be included between the limits $x +2 \sigma$. Therefore, the probability of a reading falling outside the 95 per cent confidence limit is 1 in 20 ($P = 0.05$).



Normal curve

Standard Normal Curve

Although there is an infinite number of normal curves depending upon the mean and standard deviation, there is only one standardized normal curve, which has been devised by statisticians to estimate easily the area under the normal curve, between any two ordinates. The standard normal curve is a smooth, bell shaped

perfectly symmetrical curve base on an infinitely large number of observation. The total are of the curve is 1 its means is zero; and its standard deviation is 1. The mean, median and mode all coincide. The distance of a value (x) from the mean (x) of the curve in units of standard deviation is called “relative deviates or standard normal deviates and is usually denoted by Z. the standard normal deviate or z is given by the formula.

$$Z = \frac{(x\ x)}{\sigma}$$

A random variable (x) is said to have been standardized when it is has been adjusted so that its mean is zero and its standard deviation is 1. standardization can be effected by subtracting the mean of x from x and dividing the resulting difference σ, the standard deviation of x. thus (x - x) s a standardized variable. An importance concept of mathematical statistics is that the new variate “Z” like the variate “x” also follows a normal distribution. The mean of the transformed distribution is zero (0), and the standard deviation (σ) is 1.

Areas under the standard normal curve are frequently needed. They have been computed for value of different relative deviate $\frac{(x-x)}{\sigma}$

An extract of these values is given in table 4 below

Areas of standard normal curve with mean 0 and standard deviation 1

Relative deviate from $\frac{(x - \bar{x})}{\sigma}$	Proportion of area middle of the curve designated deviation
0.00	.0000
0.50	. 1915
1.00	.3413
1.50	.4332

Estimation of probability (example) below

Let us suppose, the pulse of a group of normal healthy males was 72, with a standard deviation of 2. what is the probability that a chosen at random would be found to have a pulse of 80 or more?

The relative deviate (z) $= \frac{(x - \bar{x})}{\sigma}$

$$\frac{80 - 72}{2} = 4$$

The area of the normal curve corresponding to a deviate 4 =.0.49997 since we are dealing with only half the total area (i.e 0.5) the area beyond 0.49997 is equal to only 3 out of 100,000 individuals would likely have a pulse rate of 80 or higher.

4.0 Conclusion

Statistical data is crucial for planning and management of health care services but it is important that statistical data, once collected must be arranged purposively, in order to bring out the important points clearly and stirringly so data must be presented with utmost clarity.

5.0 Summary

You have studied elementary statistical methods an how statistical data can be presented such as tabulation, charts diagram, map averages, measures of dispersion and normal distribution. It is important to note that basic clarity must be maintained while presenting our data as when the information is understood

properly then it can be used in planning and management of health services delivery what will meet the needs of health consumers.

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7.0 Tutor Marked Assignment

Discuss three (3) methods of presentation of statistical data in health care delivery system and draws its importance to planning and management of health care services.

Unite 5 Health Information and Basic Medical Statistics III: Sampling

Table of contents

1.0: Introduction.

2.0: Objectives

3.0: Main content

3.1: Sampling

3.2: tests of significance

3.3 Correlation and regression.

4.0 Conclusion

5.0 Summary

6.0 References

7.0: Tutor Marked Assignment

1.0 Introduction

This is the last of the series in health information and basic medical statistics which will be basically on sampling, test of significance, correlation and regr4ssion. Hopefully your knowledge will be enriched trough careful studying of this unit.

2.0: Objective

At the end of this unit the learner should be able to

- Describe various sampling methods.
- Discuss tests of significance
- Explain the meaning of correlation and regression

3.0 Main content

3.1 Sampling

When a large proportion of individuals or items or units have to be studied, we take a sample. It is easier and more economical to study the sample than the whole population or universe. Great care therefore is taken in obtaining a sample. It is important to ensure that the group of people or items included in the sample are representative of the whole population to be studied.

The sampling frame

Once the universe has been defined, a sampling frame must be prepared. A sampling frame s a listing of the embers of the universe from which the sample is to be drawn. The accuracy and completeness of the sampling frame influences the quality of the sample drawn from it.

Sampling methods

The following three methods are most commonly used:

1. Sample random sample: This is done by assigning a number to each of the units (the individuals or households) in the sampling frame. A table of random numbers is then used to determine which units are to be included in the sample. Random numbers are a haphazard collection of certain numbers arranged in a cunning manner to eliminate personal selection of unconscious bias in taking out the sample. With this procedure, the sample is drawn in such a way that each unit has an equal chance of being drawn in the samples.

2. Systematic random sample: This is done by picking every ht or 10^{th} unit at the regular intervals. For example, to carry out a filarial survey in a town, we take 10 per cent sample. The house are numbered first. Then a number is selected at random between 1 and 10 (say four). Then every 10^{th} number is selected from that point 4, 14, 24, 34, etc. By this method each unit in the sampling frame would have

the same chance of being selected, but the number of possible samples is greatly reduced.

3. Stratified random sample: The sample is deliberately drawn in a systematic ways to so that each proportion of the ample represents corresponding strata of the universe. This method is particularly useful where on one interested in analyzing the data by a certain characteristics of the population, viz Hindus. Christian, Muslims, age groups etc as we know these groups are not equally distributed in the population.

It is useful o note at this stage that Greek letters are usually used to refer to population characteristics man (μ), standard deviation (σ) and Roman letter to indicate sample characteristic: mean (x) standard deviation (s)

Sampling Errors

If we take repeated sample from the same population or universe, the result obtained from or sample will differ to some extent from the result of another sample. This type of variation from one sample to another is called sampling error. It occurs because data were gathered from a sample rather than from the entire population of concern. Presuming that the sampling procedure is such that all the individuals in the population are favored equally to come to the sample, the factors that influence the sampling error are (a) the size of the sample and (b) the natural

variability of the individual reading. As the individual reading. As the size of the sample increase, sampling error will decrease. As the individual reading vary widely from one another, we get more variability from none sample to another.

Non sampling errors

The sampling error is not the only error which arises in a sample survey. Errors may occur due to inadequately calibrated instrument, due to observer variation as well as due to incomplete coverage achieved in examining the subjects selected and conceptual errors. These are often more important than the sampling errors.

Standard error

If we take a random sample (η) from the population, and similar samples over and over again we will find that every sample will have a different mean (x). If we make a frequent distribution of all the sample drawn from the sample population, we will find that the distribution f the means is nearly a normal distribution and tee an of the sample means practically the same as the population mean (μ). This is a very important observation that the sample means area distributed normally about the population mean (μ). The standard deviation of the means is a measure of the sample error and is given by the formula σ/ η which is called the standard error or

the standard error of the mean. Since the distribution of the mean follows the pattern of a normal distribution, it is not difficult to visualize that 95 per cent of the sample means will lie within limits of two standard error [$\mu \pm 2 (\sigma/\sqrt{\eta}$] on either side of the true or population mean. Therefore standard error (S.E) is a measure which enables us to judge whether the mean of a given sample is within the set confidence limits or not.

3.2. TESTS OF SIGNIFICCE

We have observed till now that standard error indicates how reliable an estimate of the mean is likely to be. The concept of standard error is applied with appropriate formulae to all statistics, i.e., mean, standard deviation, etc. it is proposed to consider briefly the following:

(a) Standard Error of the Mean

(b) Standard Error of Proportion

(c) Standard Error of Difference between two Proportions.

(a) Standard Error of the Mean

We have already considered in some detail the meaning of the "standard error of the mean" which is also called simply the standard error, and the distribution of the sample means about the true mean of the universe. In actual practice, we don't take repeated samples usually from a population. We take only one sample from the universe and calculate the mean and standard deviation. The questions that

arise are: How accurate is the mean of our sample? In order to answer these questions, we calculate the standard error of the mean and set up 'confidence limits; within the mean (μ), of the population (of which we have only one sample) is likely to lie.

Example: Let us suppose, we obtain a random sample of 25 males, age 20-24 years whose mean temperature was 98.14 dag. F with a standard deviation of 0.6. What can we say of the true mean of the universe from which the sample was drawn?

We use the standard error as the yard stick

$$S.E._{\bar{x}} = S / \sqrt{(\eta)} = 0.6 / \sqrt{(25)} = 0.\ 12$$

We now set up confidence limits on the basis of the normal curve distribution. If the limits are set out at twice the standard error from the mean (95 per cent confidence limits) the range of the population mean would be $98.14 \pm (2 \times o.12) =$ 97.90 dag. F. to 98.38 dag. F. The chances will be only 1 in 20 ($p = 0.5$) that the population mean would be outside these limits.

Very often we come across in scientific terminology the word significant'. When we say that "this difference is significant" we mean that it is unlikely to be merely due to chance. It has become customary to regard as significant, when $P < 0.05$ (1 in 20) and more significant, when $P < 0.01$ (1in 100).

(b) Standard Error of Proportion

\

Let us suppose, the proportion of males in a certain village was 52 per cent. A random sample of 100 people was taken, and the proportion of males was found to be only 40 per cent. What conclusions cloud be drawn from the sample? What possible range of male could we expect in a sample of 100, within 95 per cent confidence limits/

Confidence limits	Normal deviate (N.D.) = $\frac{x - \mu}{\sigma/\sqrt{\eta}}$	Significance
μ is outside the 95 per cent confidence limits	N.D > 2	P > 0.05 Significant at 5 per cent level
μ is within the 95 per cent confidence limits	N.D.= 2	P = 0. 05 Just significant at 5 per cent level
μ is within the 95 per cent confidence limits	N.D. > 2	P > 0.05 Not significant at 5 per cent level

In an example of this kind, we are not dealing with means but with proportions in a sample and its universe. We may designate these proportions as p and q and proceed to calculate the standard deviation round that expected 52 per cent. This is called the standard error of proportion and is given by the formula:

Standard Error of Proportion = $\sqrt{\frac{p\,q}{\eta}}$

Where p = proportion of males; q = proportion of females and n = size of the sample. Substituting the values, we get.

S. E.(proportion) = $\sqrt{\frac{52 \times 48}{1000}}$ = 5.0

We take two standard errors on either side of 52 as our criterion. The is, if the sample is a truly representative one, we might get by chance a value in the range 52 + 2 (5) = 62 and 52 – (5) = 42. in other words, the proportion of males in our sample could very from 42 to 62. Since the observed proportion of males was only 40 per cent and will outside the confluence limits, we consider the difference between the observed and expected values "significant" and is not likely to have arisen by chance. The relative deviate in the particular case, in units of a standard error of 5, will be:

Relative deviate = $\frac{52 - 40}{5}$ = 2.4

Since the relative deviate exceeded 2, it is obvious in the present example, that the deviation was 'significant;. This significant test is applicable in situations where the population consists of only 2 classes or proportions e.g., males and females, sick and health, successes and failures, etc.

(c) Standard Error of Difference Between two Means

Very often, in biological work the investigator is faced with the problem of comparing results between two groups. One may be the control group and the other experimental group. The question arises, whether the difference between the samples represent two groups is significant to indicate that the samples represent two different universes. We proceed to tackle this problem by calculation the standard error of difference between the two means.

Let us suppose, we are testing the effect of a drug on mice. 24 mice, comparable in all respects, were sacrificed and the kidney of the each animal was weighed in milligrams. The effect of the treatment on the kidney weights was as follows:

	Number	Mean	Standard Deviation
Control group	12	318	10.2
Experimental group	12	370	24.1

Let us determine whether the difference between the kidney weights of the two groups is significant.

We apply the formula for the standard error of difference between the two means:

$$\text{S. E (d)} = \sqrt{\frac{\sigma^2_1}{n_1} + \frac{\sigma^2_2}{n_2}}$$

$$= \sqrt{\frac{(10.2)^2}{12} + \frac{(24.1)^2}{12}}$$

$$= \sqrt{8.67 + 48.4}$$

$$\sqrt{57.07}$$

$$= 7.5$$

The standard error of difference between the means is 7.5. The actual difference between the two means is (370-318- =52, which is more than twice the standard error of difference between the two means, and therefore "significant". We conclude that the treatment affected the kidney weights.

(d) Standard Error of Difference Between Proportions

Instead of mean, sometimes we may have to test the significance of difference between the two proportions or rations find out if the difference between the two

proportions or ratios have occurred by chance. In this case, we calculate the standard error of difference between two proportions.

Let us suppose, we are making a trial of 2 whooping cough vaccines. The results of the field trial were as follows:

Vaccine	No. Vaccinated	No. of Exposures	No. of cases	Attack Rate
A	2.400	90	22	24.4 %
B	2, 300	86	14	16.2 %

From the above it appears that vaccine B is superior to vaccine A. is there any significance?

We calculate the standard error of difference between the two proportions:

$$\text{S.E. of Difference Between Proportions} = \sqrt{\frac{p_1 q_1}{n_1} + \frac{p_2 q_2}{n_2}}$$

$$= \sqrt{\frac{24.4 \times 75.6}{90} + \frac{16.2 \times 83.8}{86}}$$

$$= \sqrt{20.49 + 15.78}$$

$$= \sqrt{36.27} = 6.02$$

The standard error of difference is 6 whereas the observed difference (24.4 – 16. 2) was 8.2. In other words, the observed difference between the two groups is

less then twice the S.E, of difference, i.e., 2 x 6. We infer that there was no strong evidence of any difference between the efficacy of the two vaccines. Therefore, the observed difference might be easily due to chance.

Alternatively, we can use the CHI-SQUARE (x_2) Test in as example of this kind.

CHI-SQUARE TEST

Chi-square (x_2) Test offers an alternate method of testing the significance of difference between two proportions,. It has the advantage that it can also be used when more than two group are to be compared.

Let us consider the previous example: we ware making a trial of 2 whooping cough vaccine. The results of the field trial were as below:

Vaccine	Attacked	Not Attacked	Total	Attack Rate
A	22	68	90	24.4 %
B	14	72	86	16.2%
Total	36	140	176	—

Apparently, vaccine B was superior to vaccine A. the question that arises is whether the vaccine B was really superior to vaccine A, or whether the difference was merely due to chance.

(1) TEST THE 'NULLHYPOTHESIS'

First, we set up a hypothesis, called the Null Hypothesis that there was no difference between the effect of the two vaccines, and then proceed to test the hypothesis is quantitative terms. It is done in the following manner:

We first pool the results from the two vaccines. The proportion of people attacked will be 36/176 = 0.204. The proportion of people not attacked will be 140/176 = 0.795. From these proportions, we now calculate the expected. The expected number of attacks by vaccine A will be 90 x 0.20 = 18.36; the expected number not attacks will be 90 x 0. 795 = 71.55. Similarly, the expected number of attacks by vaccine B will be 86 x0.202 = 17.54; the expected number not attacked will be 86 × 0.795 = 68.37. We shall now rewrite the previous table, showing the observed (O) and expected (E) vaccines in each cell:

Vaccine	Attacked	Not Attacked
A	0 = 22	0 = 68
	E = 18.36	E = 71. 55
	+ 3. 64	3.55
B	0 = 14	0 = 72
	E = 17. 54	E = 68. 37
	- 3 .54	+ 3. 63

(2) APPLYING THE x^2 TEST

$$X^2 = \frac{\sum (O - E)^2}{E}$$

$$X^2 = \frac{(3.64)^2}{18.36} + \frac{(3.55)^2}{71.55} + \frac{(3.54)^2}{17.54} \quad \frac{(3.63)^2}{68.37}$$

$$= 0.72 + 0.17 + 0.71 + 0.19$$

$$= 1.79$$

(3) FINDING THE DEGREE OF FREEDOM

The next step in the calculation is to find out what is known as the degree of freedom (d.f.). This depends upon the number of columns and rows in the original table, and given by the formula:

d.f. = (c-1) (r-1)

c = Number of columns

r = Number of rows

In our table (cited above), there are two rows (attacked and not attacked) and two columns (vaccine A and vaccine B). It is a 2 x2 contingency table. The degree of freedom will be:

d.f. = (c-1) (r -1)

= (2 -1) (2 -1) = 1

(4) PROBABILITY TABLE

We next turn to the published probability table given below. On referring to x^2 Table, with 1 degree of freedom, the value of x2 for a probability of 0, .05 is 3.84. Since the observed is true and that vaccine B is not superior to vaccine A. the less than two.

3.3. CORRELATION AND REGRESSION

Meaning of Correlation

Often was wish to know whether there is linear relation between two variables, e.g., height and weight, temperature and pulse, age and vital capacity etc. In order to find out whether there is significant association or not between tow variables (we may call them x and y), we calculate what is known as Co-efficient of Correlation, which is represented by the symbol “r”

Suppose, we have 2 variables x and y and we have n individuals who have each one reading of x and one reading of y. the correlation coefficient is given by the formula;

$$r = \frac{\sum (x-x)\ (y-y)}{\sqrt{\sum (x-x)^2 \sum (y-y)^2}}$$

The correlation coefficient r tends to lie between – 1.0 and + 1.0. If r is near + 1, it indicates a strong positive association between x and y i.e when one variable increases the other variable also increases. A value near – 1 indicates a strong negative association i.e. when one variable increases the other decreases. If r = 0, it indicates there is no association between x and y. there are also tests to show whether or not the correlation could be due to chance. However, it needs to be noted that correlation does not necessarily prove causation.

Meaning of Regression

If we wish to know in an individual case the value of one variable, knowing the value of th4 other, we calculate what is known as the regression coefficient of one measurement to the other. It is customary to denote the independent variable by x and the dependent variate by y. The formula for obtaining the regression coefficient is as follows:

$y = \bar{y} + b\ (x - \bar{x})$

Where y = mean of $y_1, y_2\ y_3 \ldots\ldots\ldots\ldots\ldots y_n$

x = mean of $y_1, y_2\ y_3 \ldots\ldots\ldots\ldots\ldots y_n$

$$b = \frac{\sum (x - x)\ (y - y)}{\sum (x - x)^2}$$

The value of b is called the regression coefficient of y upon x. Similarly, we can obtain the regression of x upon y.

4.0: Conclusion

It is importance that every health manager understand sampling but it is important to ensure that the group of people or items included in the sample are representative of the whole population to be studied.

5.0: Summary

In this unit we have done through sampling techniques, test of significance correlation and regression. You must learnt greatly and the knowledge acquired will assist your planning and management of health services.

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7.0: Tutor Marked Assignment

1. List and discuss various sampling methods
2. Describe tests of significance in basic medical statistics.

Unit 6: Managing Health Information Units

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1.0: Introduction.

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1.0 Introduction

Computerization as an activity may not improve the efficiency of operations unless the Health Information Unit is adequately managed. This module takes look at some important considerations in the management of health information units. The structure of host organizations that will house the health information unit is considered, many criteria influencing the selection and operation of items in the Health Information Unit a discussed while attentions is focused ion the need for adequate maintenance of equipment in the Unit as well as provision of security

both to the hardware and the software (especially security of data and information). Operations and managers of health and the software units are called upon to observed various legislation on protection of classified documents, the cop right law and the official secrecy Act.

2.0 Objectives

At the end of this unit the learners should be able to

- Define some concepts in management of health information units.
- Discuss organization and content of health information unit
- Describe the national health management information system unit
- List the roles and responsibilities of health information manager
- Describe national health management information system unit minimum package

3.0 Main Content

3.1 Introduction

What is a System?

A system is a set of interrelated brought together to achieve a purpose in the environment in which the system exists. It is a group of element which are related

(persons, procedures organisation, equipment, concepts etc.) in such a way that they influence each other and the behaviour of the elements as a whole.

The National Health Information System- This is set of people, procedures and equipment organized for the purpose of providing information when necessary and required, in a suitable from for programmes, and international exchanges of health information. Its function is to supply necessary information for management of the national health programmes at all levels.

The structure of National Health Information System often take the following pattern. In some countries, the basic structures with which a MIS function have been set up. In most cases, the structures are arranged in a pyramid, often supported by parallel, vertical programmes.

At the central level, duties of the health information unit include.

- Co-ordination, centralizing analyzing, updating sorting and disseminating health information.
- Designing standard procedures and mechanisms for the notification, recording and use of data.
- compiling data by special surveys
- meeting national and international commitment concerning health information.

At the intermediate level (state level), duties include:

- centralizing health unit reports
- analyzing, compiling and processing statistical data.
- nofying those con concerned of important events which may call for action.

At the local level, these activities are carried out by personnel responsible for health deliveries in health centres, hospitals, mobile teams or within communities. Hers there is heavy reliance on health files as available source of health information.

Basic Requirements

Several arrangements may be envisaged for information systems in terms of needs, priorities and means available. There are no universal models, just as there are no universal models for health systems, thus organisation, operation and support which an information systems for management requires will be different. Basic requirements are:-

(a) The structure of information systems should be determined be that of the National Health System. We should being by examining how the health system is organized and hoe its components are linked. The degree of centralization and decentralization of the information system will be determined by how central or decentralisc the health system is.

Management information system should support health care based on PHC declaration of Alma-Ata, 1978.

(b) We must understand which needs to meet and how to use information.

(c) Information need not be more precise than the process it tries to clarify. Managerial process for the development of national health programmes very in precision. Many economic, social and political Factors which are often hard to quantify play a part in decision making. Decision makers and managers requite information support containing reasonable estimates.

(d) Information should be sought which is needed by clearly defined users for specific purpose.

(e) Approximate information supplied inn time is better than exact information supplied too late.

(f) Feedback from the producer of data is essential; collectors of information should known how the data and information they supply is used and so understand the importance of their work.

(g) A continuous evaluation arrangement is indispensable to periodic appraisal of user's information needs and in order to avoid collecting and processing unnecessary data and information.

3.2. BASIC CONCEPTS IN MANAGEMENT OF HEALTH INFORMATION UNITS

Artificial Intelligence: The concepts that computers can be programmed to assume some capabilities normally thought to be like human intelligence, such as learning adaptation and self correction. **Compatibility:** The ability for computer programs and computer readable data to be transferred from one hardware system to another without losses, changes or extra programming.

Configuration: The particular choice of hardware and its connection making up a computer system.

Data Base Management System: A set of programs for establishing, sorting, searching and otherwise manipulating the database. It generally permits further calculations and the production of reports.

Data dictionary: The set of standard descriptions of data items and entities which are used in all programs in an organisation. It includes definitions, codes, validation rules, ownership right of access, right of updating.

Decision Support System (DSS): A management information system in which significant analysis is done in order to present reports in a format directly useful for decision.

Distributed data base: A data base which, thought conceived as one while, is held in more the computer.

Normally, most of the data files are stored closest to the main user shared by all.

Duplex: A transmission system allowing data to be transmitted in both directions simultaneously.

Information; A comprehensive term covering all aspects of the development and operation of information systems, the supporting computer methodology, and the supporting telecommunication links.

Information Centre: An organisation entity charged with providing general support services for users of information system.

Information retrieval: The action of recovering information on a given matter from stored data.

Interface: The boundary between two hardware or software systems across which data are transferred.

An overall term to refer to the physical linkages and procedures, codes and protocols that enable meaningful exchange of programs' commands or data between two

computerized systems or devices.

Local Area Network (LAN): A high speed geographically constrained (e.g. office complex) communications arrangement between computing equipment permitting data transfer, sharing of common resources and convenicant physical connections to the users.

Network: A set of computers and peripherals connected by communications links.

Office automation: Pertaining to the operation of a functional unit when not under the direct control of the computer.

On link processing: Performed on equipment direct under the control of the central processor while the user remains in communication with the computer.

Protocol: The formal rules governing the exchange of information in a communication link including format timing, sequencing and error control.

Secondary storage: Storage or memory which is not located in the central processor of the computer but is in peripheral media such as tapes, disks, diskettes etc.

Security: The establishment and application of safeguards to protect data, software and computer hardware from accidental or intentional modification, destruction or disclosure.

Telematics: he use of Telematic of transmit medical data

Validation: A process of testing by applying criteria to them to doctrine whether they are suitable for entry into a datad.

Work station: A specialized +terminal with some independent data processing capability

3.3 ORGANIZATION AND CONTENT OF HEALTH INFORMATION

Mission of health information unit

It is important to have a mission statement for the health information unit. The overall objective of health information is to meet information requirement stall levels of the health services for purpose of management of health system and provision of health services.

A policy establishes the roles an organization must follow in carrying out its works. Established health information policy helps us to ensure that development and sue of systems will proceed in a coordinated manner. The information policy must be in consonance with the health policy in the country. At the same time, the national health information policy must set limits to any policy that may be established at the lower hierarchy of the information system e.g. at state or local government level.

What is a mission statement?

A mission is a very general pulse that can endow everyone in an organization and all day they do with a sense of purpose. It serves to mobilize an organization into concreted action. It is a vision of something strongly desired, accompanied by a commitment to its pursuit. Selection of a mission provides the idealized design process with a focus that enables it to attain cohesiveness (i.e a complete harmony of its parts.

A mission statement is much is more than a specification of a role for a system. A mission should make explicit those aspect of development to which the health information unit intends to dedicate itself and in general sense how it intends to pursue them. A mission statement should be a purpose to which virtually all of an organization's stakeholders can dedicate themselves.

The government policy statement on the objectives of the national health information system calls that the system shall be used as a management tool to:

- assess the state of the health of the population
- identify major health problems
- set priorities on the local, state and national levels targets
- provide indicators for evaluating the performance and impacts of health services

- Provide information for decision making.

In terms of mission statement, it could be said that the national health policy has mandated the establishment of a health management information system. Structurally, this would consist of a national network of centers (inclusive of PHI ME units) set up for data collection, storage, retrieval, processing and dissemination for decision making and action. The system will assist government to plan, operate, control, monitor and evaluate specific health goals and objectives (e.g health intervention programmes, epidemic outbreaks etc) and the national goals of health for all Nigerian by Year 2000.

A strategy is a set of activities and/ or programmes chosen ignored to achieve long range objectives. It determines directions to be followed, so that all involved can work cost effectively, it gives the time goals of activities and contains provision for strategy updating. Whereas a policy sets down the rules, a strategy describes what will be done within the informatics, the policy creates a framework from which strategies are to be derived. In the formulation of polices and strategies at the national level, regional and local contributions must be considered.

A major strategy of objective of HIS is the delimitation or reduction of deficiencies in the qualify, quantity and relevance data and the timely access to information. The implementation strategy should address issues such as:

a. Improvement of communication and collaboration among HIS managers and end users of information.
b. Major decision to be made regarding future needs, allocation of information resources and standards of compatibility
c. Priority of various applications, considering such criteria as return on investment ands for health care delivery, logistics, administrative and managerial support.
d. Avoiding and/or climinating "automation island" i.e system that cannot be integral with other systems.
e. Maintain s technology balance of hardware and software among users.

Period strategy development or upgrading is required to response new and increased requirement of users, to reflect changes in country's health sector and take advantage of continued improvement and cost reduction offered by technology.

3.4 THE NATIONAL HEALTH MANAGEMENT INFORMATION SYSTEM (NHMIS) UNITS

The NHMIS unit is the data base on the health related information in the country. At the unit there is co-ordination of data from the various department of the Federal Ministry of health, from other Federal Ministries, from Research Institutes, Teaching Hospital and relevant University departments, from state

Health Information Units, and from Bilateral, Multilateral and non-government agencies information generated at the central medical library and the Ministry's Health research and survey Activities will also be accommodated at the NHMIS Unit.

At each state level, a state Health information center will exist. Like the NHMIS Unit, State health information units will co-ordinate information from health department, outside, ministries and agencies, research findings, library and registry findings and local government health activities., the ultimate objectives is that information will flow between the three tiers of health care delivery system (i.e the primary/secondary and tertiary) with the NHMIS Unit being the final repository of information.

The current efforts is intended to institutionalize 'Health information collections and utilization and to strengthen sate capacities in this direction with an effective feedback mechanism. Information generated at the village level will thus be transmitted to health center, from health centers to secondary Health Care points (General Hospital or Comprehensive Health centers), from the SHCF's to state Ministries of Health and finally to NHMIS-Information, of course, is two ways. The flow should be upward and downwards.

3.5 ROLES OR RESPONSIBILITIES

Once the policy for HIS is formulated, it must be implemented in a co-ordianted manner. It is usually convenient to establish a formal organizational entity to co-ordinate implementation. Such group may be charged with formal co-ordinating function such as:

a. Conducting surveys and research on the implementation of HIS activities in programmes area
b. Taking measures to solve problem that stand in the way of computer utilization and establishing systems and procedures of assistance to national, regional and local agencies actives HIS.
c. Promoting training of computer personnel and co-ordinating system-wide training programme
d. Conducting research into computer sharing and promoting the joint use of computers, computer files and software in other to diminish cost and establish an inter-organizational network of information systems.
e. Preparing and disseminating policies and guide lines on the requisition and use of information resources.

The co-ordinating group must strike a balance between indiscriminate or unregulated use of computer resources and overly rigid procedures that may hinder effective development

The HIS unit may require legislation, operational regulations and guidelines. As part of a HNMIS, it should establish linkage, common standards, procedures, etc for sharing of information with others sectors.

Any complete strategy for achieving a set of objectives must describe the lines of responsibility and resources to be made available. Those responsibilities involved. Health services, have additional complicating factors because of the potential clash between those responsible for individuals (i.e involved indirect patient care) and those responsible for the entire organization and community at large (managers). It is important for HIS manager to establish clear lines of responsibility.

The following activities are needed to be taken into consideration

Skills: This is a very important component to the success of HIS unit. The quality o skills of the people involved as well as their continuity in the task will enhance the success of HIS unit. Knowledge and skill on the part of the final user of informatics is essential. There should thus be the identification and measurement of these needs plan to satisfy it.

Human resources requirement for HIS unit: Assessment must be made of the numbers, level of experience and balance of skills, required categories such as systems and programming staff, telecommunication staff and specialized professional management.

Human resource deficit: The next task is the assessment of the gap between short term requirement and the existing situation in human resources.

Human resources development: From the basic assessment made of the existing resources and skill needed, a human resources development plan can be prepared. The human resources needs can be met by these key elements.

- awareness programmes: essential to all staff including senior managerial staff at all levels in order to promote a receptive and forward attitude
- education of health professionals: since most of the health professionals will be active in the HIS to some extent (either input data), provision needs to be made for the education of these professionals is HIS.
- Recruitment: decide whether to recruit new staff, if so whether locally or whether it will be necessary to look for them elsewhere.
- Staff retention: maintain attractive employment condition to ensure reasonable level of staff retention.

3.6 NHMIS UNIT MINIMUM PACKAGE

The establishment and management of an effective HNMIS requires substantial involvement by central, state and local government health authorities in manpower and infrastructure development and in assistance within and between the levels. As part of an overall strategy to improve the quality and quantity of

health data and information available for decision making, HMIS units should have a threshold of minimum package to enable them function effectively.

3.7 OTHER MATTERS

One of the duties of HIS manager is the maintenance of standards. The obvious rationale for standards is to facilitate the exchange of programmes and data. Standards are needed in the following areas.

1. Data standards: since data are collected from a number of sources and aggregated at several levels for further analysis, standards must be defined and enforced to control the data to be collected and their definition and format, data security and protection and the medium of presentation of the data.
2. Technical standards: This is to ensure compatibility of system within a nation's health services. Technical standard should exist for communication protocols, software package, programming languages and operating system.
3. Work standard: it is almost certain that there will be the need to share or exchange systems, applications or data between institutions. In these circumstance it is of great advantaged to establish operating standards for the work force. Thus security and data control should be uniform in order to

permit flexibility of staff assignments and to make sure that the controls are well understood and applied.

4. Equipment standards: it is important to ensure compatibility of equipment throughout the service. Effectively, this might means dealing with only one supplier, with loss of negotiating capability on the part of the buyer. At the other end of the scale is the "do-it-yourself strategy whereby the buying organization make their own adoption of standards for data management and technical issues. Standards for equipment should lie between these two extremes and should be carefully monitor throughout, in order to optimize utilization of resources and efficiency of operations.
5. Service standards: There is the need to establish standards of training throughout the services, to ensure predictability of both trainers and trainees.
6. professional standards: These are the ethical standards adopted for the health management information system. They include level of acceptance of professional behaviour, codes of practice and technical competence for senior health information unit staff.

3.8 SECURITY

Usually, the focus should not be on terminology but on authorized disclosure of information. Integrity is the prevention of unauthorized modification of

information while availability of information deals with prevention of the unauthorized withholding of information or any other resources for the smooth functioning of the HIS unit.

Health information system often store identified data on health status of people. Such data are often highly sensitive and should be treated confidentially. Also specific selections of these confidential data are needed by many health care professionals for their routine task. So access, control and authorization deserve special attention. Furthermore, data play an important role in the care of patient process. Thus the speed of processing and communication is important. Data are not only useful to support the care process; they are also required for research statistical analysis of data of groups of patients can provide additional medical knowledge for further improvement of health care. Here a conflict between the right of privacy of the patient and the interest of the community arises.

Some advice on security

1. Secure from fire, burglary, etc.
2. determine password and computers with locks
3. have a policy on whether diskettes from other center can be brought in what about anti-virus checks

4. If system is linked with others (i.e networking) determine access that others can have to a particular file or data set. What protection there are to other people work.

4.0 Conclusion

Every health manager must realize that health files have some short coming such as the health files lacking informity which makes it difficult to collect and analyses information, information may be fragmentary as health files only prepared for patients who have in fact been treated and cover only a fractional part of the population and over stringent regulations aimed at protecting the confidential nature of health files and this may be hindrance to in-depth analysis.

5.0 Summary

Going through this unit we have studied how to manage health information units without any doubt you have been exposed better and the knowledge gained is an asset to your professional practice.

Further Reading

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7.0 Tutor Marked Assignment

What factor determines the extent of centralization and decentralization of the health management information system?

Unit 7: Usefulness of Information Technology in Programme Planning and Implementation

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7.0: Tutor Marked Assignment

1.0 Introduction

Unit 7 deals with the usefulness of information technology in programme planning and implementation and this cares health informatics, informatics in the management of health care and management of facilities and equipment. A though understanding of this unit will help the health manager in the daily discharge of his duties to the benefits of health consumers.

2.0 Objectives

At the end of this unit the learners should be able to:

- Discuss the usefulness of information technology in programme planning and implementation.
- Explain what health informatics is
- Describe the relevance of health informatics in the management of health care.
- Enumerate management of health facilities and equipment.

3.0 Main content

3.1 Introduction

The decision making process for health programme planning and implementation requires relevant information. This information may come from existing reports and survey or it may be necessary to carry out special survey, to introduce or strengthen the collection and analysis of data as an intrinsic function of the health systems

Information gathering and analysis are expensive, especially if carried out as a separate activity. Before embarking on information gathering and analysis, it is important to identify clearly, who the users of information are likely to be and what kind of information they are likely to need. For example, in health programme planning and implementation, the information requirement of health managers, health care personnel, research workers and trainers of health personnel will vary and differ from one another. Also other people involved in health matters in other sector of the economy top-level policy makers and executive decision makers; and the general public will require varying type of information. Selectivity is therefore the key point in deciding what information should be collected to support the managerial process for national health development. Each of the above mentioned categories of people may require even the same information but presented in different ways. Most will require demographic information but the degree of data require will vary greatly. Depending on the circumstances and subject to availability of data, relevance may play a role in the selection of information.

Specifically, for policy formulation, information on socio-economic policies and national health policies should be made available during the analysis and/or reformulation of current policies. Information on the availability, accessibility and utilization of various type of health car, income pattern, literary level and educational system will be important for some health programme implementation. Of course, the pattern of health problem measured in terms of mortality, disability and prevalence which may be relevant for the design or selection of interventions may help to focus planning and programming on the most relevant aspect of the health situation. Other areas of information include those on resources and facilities e.g bed/population ratio, health training institutions; or health manpower situation especially distribution by specialty, urban/rural distribution, age distribution and attrition rate will all be important in health programming and implementation.

For information to be useful in health programming, it must support both managerial and technical functions. Information generation, analysis and dissemination is not to replace these technical and managerial functions but merely to support them. Furthermore, health information system should follow the structure of the health system itself. Only information that is required by specific users, for specific purpose should be south. The information need not be ore precise than the process it support; approximate information may be adequate in

some situation measure have to be taken to ensure that produces of information are producer with feedback information. Given the background discussed above, the relevance of information technology can not be overemphasized, especially as it relates to information processing and presentation.

Health informatics is the application of information technology to health situations. Health informatics is the application of information technology to health decision situations. Health informatics is at its infancy in many parts of Africa but eh basic skills, hardware and networks are available to help the development of appropriate information system and for appropriate interfacing or integration with existing system. The aim of this sub-modules is to highlight:

1. Where, when how and for what purpose informatics be used in health services and
2. how to manage these services in order to benefit most from informatics

Informatics may be defined as the combination of technology and methodology which makes possible the computer assisted collection, storage, processing, retrieval, distribution and management of information. Telematics is the use of informatics in telecommunications. Thus here we shall focus on both informatics and telematics as components of information technology in health programming.

3.2 Health Informatics

Health informatics will work in any health system irrespective of its level of findings and sophistication in planning provided the health care management structure is well defined with focal points of accountability and decision making. In the health sector, managerial decision requires relevant and accurate, reliable and timely information. It should be recognized that the introduction of informatics may cause some changes in the structure of the health system. However, the belief that only developed countries can afford computer technologies is a misconception. With the willingness on the part of policy makers most countries can afford informatics and telematics in it s health care system. This is particularly so if they wish to strengthen primary health care services and run efficient management system.

It is important to note the following point.

1. Computer can store, manipulate and retrieve large amount of information quickly and efficiently: Consequently, it should not be difficult to see the usefulness of computers in health programming and implementation, especially where large data has to be processed.
2. Information stored in computers may be transmitted through telecommunication links (i.e. cables telephone lie and satellites).

3. Most countries suffer from an abundance of analysis data with limited relevant to strategic planning and to management of health programmes. Thus informatics cannot be regarded as an isolated discipline or technology. It must be viewed as an integral and essential elements of the managerial process for national health development. It should thus be recognized that rationalization of managerial procedures is a perquisites for computer use. This itself will yield benefit, irrespective of the eventual automation. Furthermore, the importance of management sciences in the rationalization of operational and administrative activities indispensable. Many health delivery problems can be directly related to the appropriate, effective and efficient use of resources.

An important area for the development of informatics in health is the management of health programmes at district level. Computer network connected through adequate telecommunication services can be an important tool.

Informatics has a defined role in the training and education of health workers since health workers will use informatics in their daily routine, they will need to be taught hoe to handle tools of informatics and use them to maximum advantage. Although health informatics offers appropriate

technology to meet information requirements at all levels of the health services in an effective and efficient manner, health care managers require a policy and strategy to guide their day-to-day decision on the use of informatics in their organizations. The health informatics policy chosen must be in consonance with the implementation of the health informatics policy may be assigned to a formal organizational entry, e.g policy must establish common rule such as standards, priorities and guidelines, and prepare the ay for compatible legislation and regulation of the system. Here, standards are needed to ensure the reliability and security of data. There should be definitions of technological standards to facilitate communication and sharing of data computers and users. Also there should be definition of policies for human resources development, allocation and utilization.

These elements will not work unless there is periodic updating of strategy of health informatics order to reflect changes in technology and changes in user's requirement.

3.3: Informatics In The Management Of Health Care

Health programmes have much to gain by the appropriate use of informatics technologies. Manual system of health management suffer from problems of inaccuracy and incompleteness. The risk involved in strategic and managerial

decision making is increased when there is no informatics support. The need to perform “what if” analysis is enhanced with informatics technologies. Informatics can be use to assist management in policy formulation, planning budgeting, programme implementation and evaluation. It reduces the problem of inaccuracy incompletes and unavailability of data, transcription errors and delay that occur in manual information systems.

Informatics allows the aggregation of data many sources the analysis of large volumes of data in a short time and increased efficiency of collection, validation, storage, retrieval, presentation and distribution of data.

Informatics can be used to support the managerial routine and the day-to-day operations of healthy care organizations, contribution to overall efficiency and effectiveness. For example, in the field of management sciences and operations research, tools have been developed that support the decision making process. Such tools can assist in choosing among competing alternative, evaluating the outcomes of health decision, and allocating scare resources.

3.4 MANAGEMENT OF FACILITIES AND EQUIPMENT

Computer applications help the manager to analysis vital information about the organization. Transaction processing system records the basic activities of the organization. Management information system provides data base oriented

applications, analysis and summary of operational data, applications in the area of resources management, personnel management and operational statistics.

Decision support system use spreadsheets and graphic, simulation, decision theory approaches. Financial analysis system use special software and spreadsheets to perform cash flow analysis financial balance, cost analysis budgeting and control. Audit can be more effective with special support system.

Informatics system can support the management of drugs and pharmaceutical, maintenance of inventories, scheduling maintenance and stock ordering. Health care management uses tremendous amount of office labour. Complete records are written, data are over abundant, filing activities are extensive and all must be maintained for administrative and clinical purpose. Office automation is one activity that follows the use of information technology in health. Office automation has great potential for improving office effectiveness and productivity. It can support document production, information storage and retrieval, time management and communication.

Computers can assist self and community care in keeping records, detection of risk, training in self care and, remote consultation and diagnosis. Informatics can support management of referral and medical record data collection and analysis

Informatics can support:

1. Patient record keeping

2. clinical laboratory services
3. radiology department
4. medical diagnosis
5. dietary services
6. emergency services
7. blood bank services
8. intensive care unit
9. transportation unit
10. rehabilitation unit
11. Hospital infection control programmes.

The choice of informatics technology has to depend on the goals and scope of automation desired. Specially each organization or health programme before selecting a health informatics technology will software select the appropriate computing hardware, operating and utility software, application software and subsidiary services such as teleprocessing. Once this is done the organization can now plan for implementation, training and support for the system.

The general criteria to be followed in system selection are:

a. reliability: hardware and software should not fail frequently

b. compatibility: hey should be compatible with other lines of standard hardware and software.
c. Capability: mass memory, processing speed, need for special interfaces or converters to meet the objectives of the institution
d. Expandability: they should be able to expand to meet future growth of the health information system.

Finally, cost issues are important. Investment informatics should be evaluated based on rigorous criteria that will be sued to evaluate any other investment of capital nature in health.

4.0 Conclusion

For information to be useful in health programming, it must support both management and technical functions. Information generation, analysis and dissemination managerial functions but merely to support them, health information system should follow the structure of the health system itself.

5.0: Summary

Health informatics is the application of information technology to health decision situations. I do hope that your performance as health manager will be enhance by your studying this unit.

6.0 References

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7.0 Tutor Marked Assignment

Discuss the relevance of health information in the management of health care.