III B.Sc NUTRITION, FSM &

DIETETICS

Community Nutrition

SUBJECT CODE: CNU53

UNIT-5

Strategies to combat Nutritional problems-fortification, enrichment, supplementation and Immunization programmes. Nutrition Education - Meaning, Scope, Methods - Planning, conduct and evaluation of Nutrition education Programme.

25

NUTRITION EDUCATION

Nutrition and health education can be defined as a planned effort to improve nutrition and health status by bringing about changes in the behaviour of people. It is a process by which people gain knowledge and develop confidence and skills needed for establishing good dietary and health practices. Most people have some knowledge in nutrition but a very few have correct concepts and finer nuances of the subject hence there is need for nutrition education for both literate and illiterate.

According to Geoffrey (2002) the stages of a nutrition education are as follows:

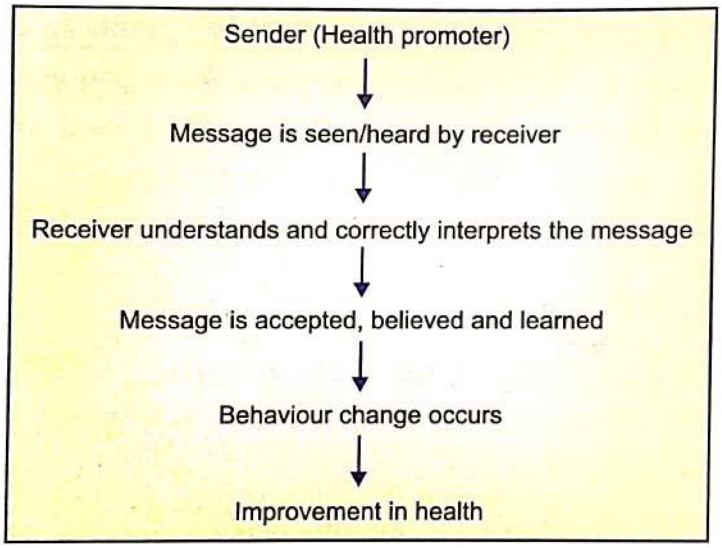


Figure 25a: Design of Nutrition Intervention.

METHODS USED IN NUTRITION EDUCATION

Bringing about a change in behaviour is not easy. It requires a vigorous and concerted effort through a variety of communication methods.

Lecture method: It is the most economical way of getting a vast amount of information across to a large group of people within the least time. It is a one-way communication method

that does not involve the people much. It is not suitable to promote behaviour modification or teaching skills that need practice. For increasing the effectiveness of a lecture, the characteristics of the audience should be borne in mind and the topic should be of interest to the audience. Appropriate aids should be used in between and there should be provision for discussion at the end of the lecture.

Group discussion method: This is a two-way communication method and is one of the best ways to modify behaviour. This method gives a feeling of belonging and the support of other members makes it easier for people to take decisions and change their attitudes and practices. Discussions can be carried out in small groups with group leaders where the topic can be discussed separately and then leaders can express their group's viewpoints to the larger groups.

For discussions to bring about desired results, a good leader should be chosen. The members of the group should get acquainted with each other and they should actively participate. They should share their experiences, listen to what others have to say, learn from each other and find out solutions of their problems together.

Role play/Drama method: Role play is a spontaneous dramatization which is not rehearsed and sentences are composed on the spot. It is an activity where people act out in real life situations. Some may also pretend to be persons with certain problems. Drama could be in the form of skit or a short play. It could also be done using puppets as an aid.

Story-telling: Stories are a traditional form of learning that people experience from childhood. Stories can be close-ended followed by a discussion initiated by the story-teller or they can be open-ended where the group members themselves would complete it. After the story-telling session is over, the major points of learning should be repeated for reinforcement. This can be done by simply asking, "What is that you have learnt from this story?".

Demonstration: Demonstration is a way to show people how to do something step by step so that they can learn new skills and how to do things themselves. Each step of a demonstration is accompanied by an explanation of what is being done, how is it being done and why is it being done. The people therefore get an opportunity to see how to do something before they actually try it themselves. Demonstrations can be of two types:

(*i*) Method demonstration, where a procedure is carried out step by step, slowly and accurately before an audience.

(*ii*) Result demonstration, where the results of an activity are demonstration and discussed. The end products of each step are prepared beforehand in this method.

Problem-solving method/Brainstorming: This technique helps people to logically come out with solutions to their own problems. A group leader can identify and present the problem to the entire group. He can then ask the group members to share information and ideas related to the problem listed down. The most practical ideas/solutions can be selected and acted upon to solve the identified problem situation.

TEACHING AIDS USED IN NUTRITION EDUCATION

Teaching aids are required to increase the effectiveness of communication methods. Teaching aids make learning real, practical and fun through seeing, hearing, discovering and doing.

Teaching aids could be machine operated or non-machine operated.

While preparing any teaching aid, one must consider the following points:

- They must be made from low cost, locally available material.
  They must be in accordance with the message they intend to convey.
- They must be selected in accordance with the target audience for which they have to be used.
- The message on the aids should be brief and clearly written. The language used should be simple to be understood by the target audience.
- The aids should be attractive but at the same time should not suppress the actual message that needs to be conveyed.

Posters, pictures, models, charts, flash cards and flannel graph are non-machine operated teaching aids. Figure 25*b* gives some non-machine operating teaching tools.

Figures 25b: Some Non-machine operated nutrition teaching tools — Over lay chart, flash cards and tree chart.

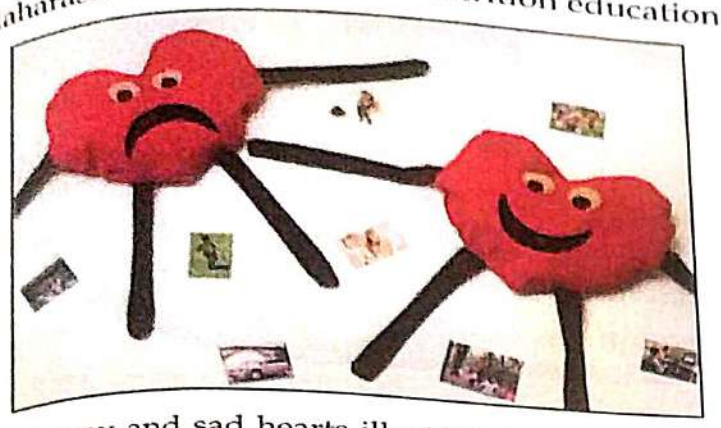
Machine operated aids are Film strips slides, audio tapes, and CDs. Scientific information can be presented in meaningful way. These are readily available, easy to operate, can be stored and also can be used again and again. Figure 25*c* shows power point presentation is being used for nutrition education.

Figure 25c: Power point presentation is being used for nutrition education.

Traditional Media Methods

Folk media can be used to complement interpersonal communication as they have the potential to generate interest in nutrition related topics thus enlarging the scope and effect of the interpersonal communication for nutrition education.

Burrakatha of Andhra Pradesh, Villupattu of Tamil Nadu, Alha of Uttar Pradesh and Powada of Maharashtra are effective for nutrition education.



These happy and sad hearts illustrate how the children's bodies feel when they make healthy choices, such as eating fruits and vegetables and being active, and unhealthy choices, such as watching a lot of TV.

Celly and Active Albert are two puppets created to assist in teaching nutrition and physical activity content.

Figure 25d: Puppets can be used for nutrition education.

Puppetry has fascinated people of all ages. Puppet shows are good communication folk approach. The learner enjoys the media and learning is effective.

MASS COMMUNICATION MEDIA USED IN NUTRITION EDUCATION

Mass media are powerful tools in teaching and educating vast audience quickly. They are essentially classified on the basis of the form in which information is communicated to different masses as written, spoken and audio-visual media.

In written media the information is presented in the script form using language, with or without illustrations and also exclusively through illustrations. Examples of written media are leaflets, circular letters, folders, banners, calendars and newspapers. These media call for reading skill of the learner for successful communication.

Spoken media means oral communication using language. Radio is an example of spoken media. This medium can be utilized successfully based on the listening skill of the audience.

Audio-visual media includes both oral and visual communication simultaneously which stimulates both audio and visual senses of the audience. Television and films are one such medium. Audio-visual media demands seeing and listening skills of audience to make the maximum utilization of the media. This is the most effective method in reaching the masses.

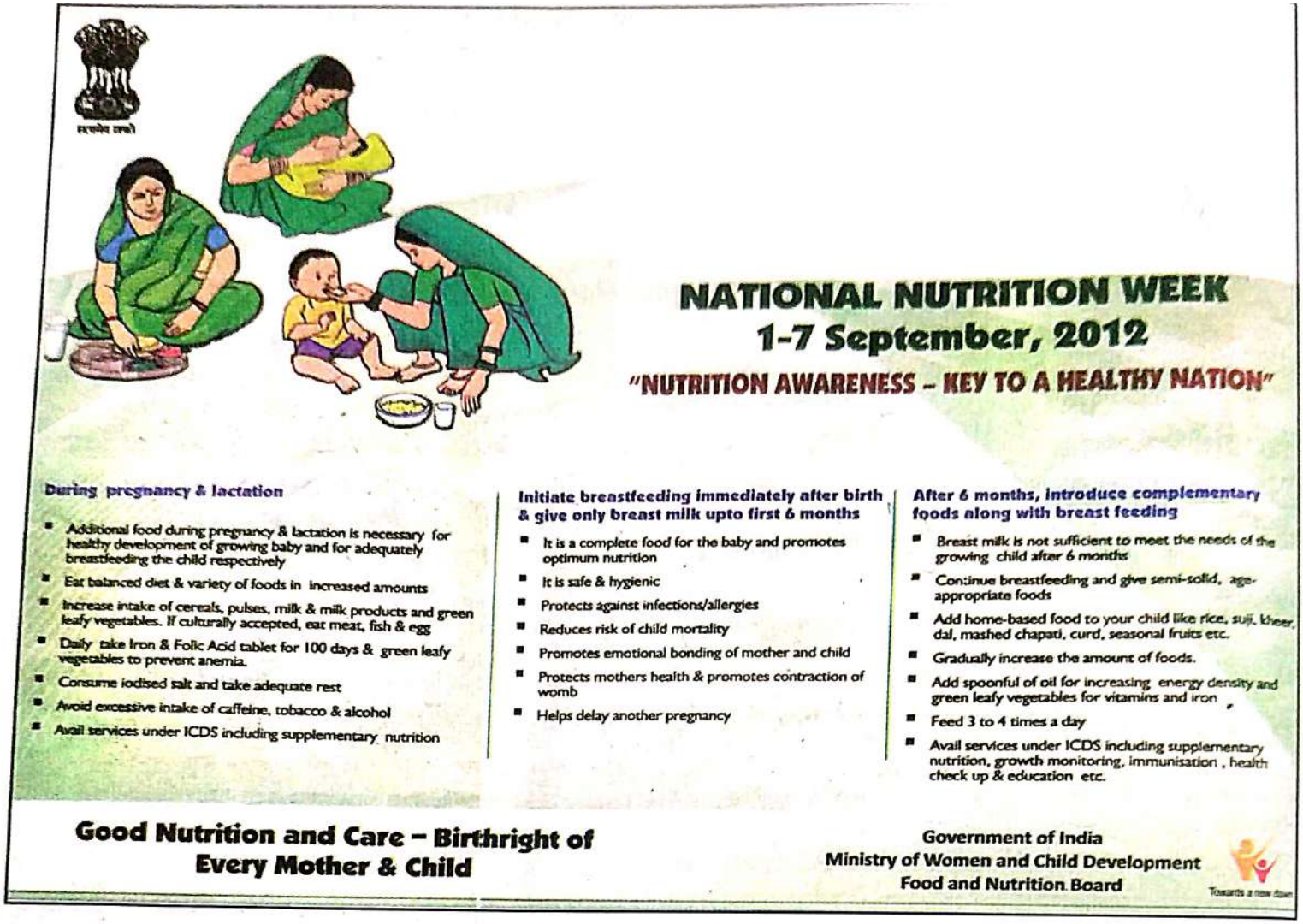


Figure 25e: Mass Communication through newspaper—written media.

Nutrition Exhibition

It is a method of communication using all kinds of media written, spoken and audiovisual. All kinds of teaching aids are also used, making it the most effective method of communication. Though there is mass communication, education is given at individual level or on small group level. Nutritional concepts are made clear in nutrition exhibitions by displaying different foods, amounts to be taken and equivalents in nutritive value. Lot of practical information in nutrition can be gathered at one place. Nutrition exhibitions are put up by schools, colleges, hospitals or food processing industry. It is usually meant for the public who can get nuances of nutrition knowledge and carry useful messages on nutrition with them.

Portable Exhibitions are also developed which can be moved from place to place.

Figure 25f: Nutrition Exhibition—Best method to give public about nutrition information.

Walkathon/Marathon Race

Walkathon/marathon race is conducted for creating public awareness on nutrition. Scho college students or members of NGOs, participate in walkathon with a purpose of cre awareness on a topic in public. They carry posters or placards with a message. The g as well as their aids attract the common man and make them understand the importa nutrition facts.

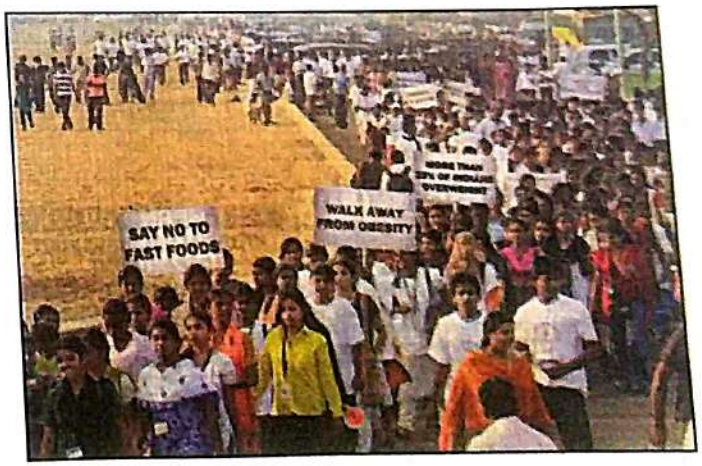


Figure 25g: Walkathon to create awareness about diabetes and obesity.

NUTRITION EDUCATION THROUGH EDUCATIONAL INSTITUTIONS

Schools and colleges provide the most effective and efficient means to reach a large segment of the population, including young people, their families and the community in general. Nutrition education can be given through formal lessons.

Nutrition education in the class room tend to carry over into homes and often children change the eating habits of the family. Children need to know that replacing milk intake by soft drinks is detrimental to bone. Nutrition education programme should incorporate messages about the influence of media and advertising on attitudes and behaviour on food. Children should understand the relationship between TV viewing and poor dietary behaviour. Nutrition education at all levels should be integrated into the full curriculum and should involve students in the planning and implementation. In addition, school and college breakfast and lunch programmes should model food patterns based on RDA. Since most of the children attend the school, it is ideal environment for the promotion of healthy eating.

Food and Agriculture Organisation of the United Nations along with a group of international and non-governmental organisation has launched a global education initiative called 'Feeding Minds, Fighting Hunger' (FMFH) with the aim of educating and motivating school children to get actively involved in creating a world free from hunger and malnutrition.

Three different lesson plans of FMFH are suggested for primary intermediate and secondary school levels.

The lesson plans for all school levels deal with three different topics

1. What are hunger and malnutrition and who are hungry?
2. Why are people hungry and malnourished?
3. What can we do to help end hunger?

Apart from these guidelines, a variety of classroom activities including teaching aids and discussion points are also provided.

Figure 25h: Nutrition education through felt board. This felt board helps teach the importance of a colorful food plate. The board promotes discussion of the benefits of each color group and encourages children to choose a variety of colors each day from the fruit and vegetable groups.

School gardens are emerging as health education tools in academic settings. School gardens are perceived as an effective tool for promoting healthful eating habits. It is heartening to speculate that garden-based nutrition education, when implemented may be one small tool with tremendous impact. Garden-based nutrition education helps to increase consumption of fruits and vegetables among school children.

Figure 25i: Schools can impart nutrition education through school gardens.

Games are developed for school children using/without using computer to educate on nutrition. An example is in the line of 'snakes and ladders' a board game is developed with 'carrots and noodles'. Canteens and dining halls are good places to put up posters related to good nutrition.

Formal Distance Education

The Indira Gandhi National Open University, set up in 1985 is the world's largest university. IGNOU offers Masters programme in the area of Dietetics and Food Service Management through distance education. B.Sc. (Food and nutrition) graduates are eligible to apply. Other science graduates can also seek admission provided they have a degree/diploma certificate in the area of nutrition from IGNOU. Online courses related to nutrition are also conducted by IGNOU.

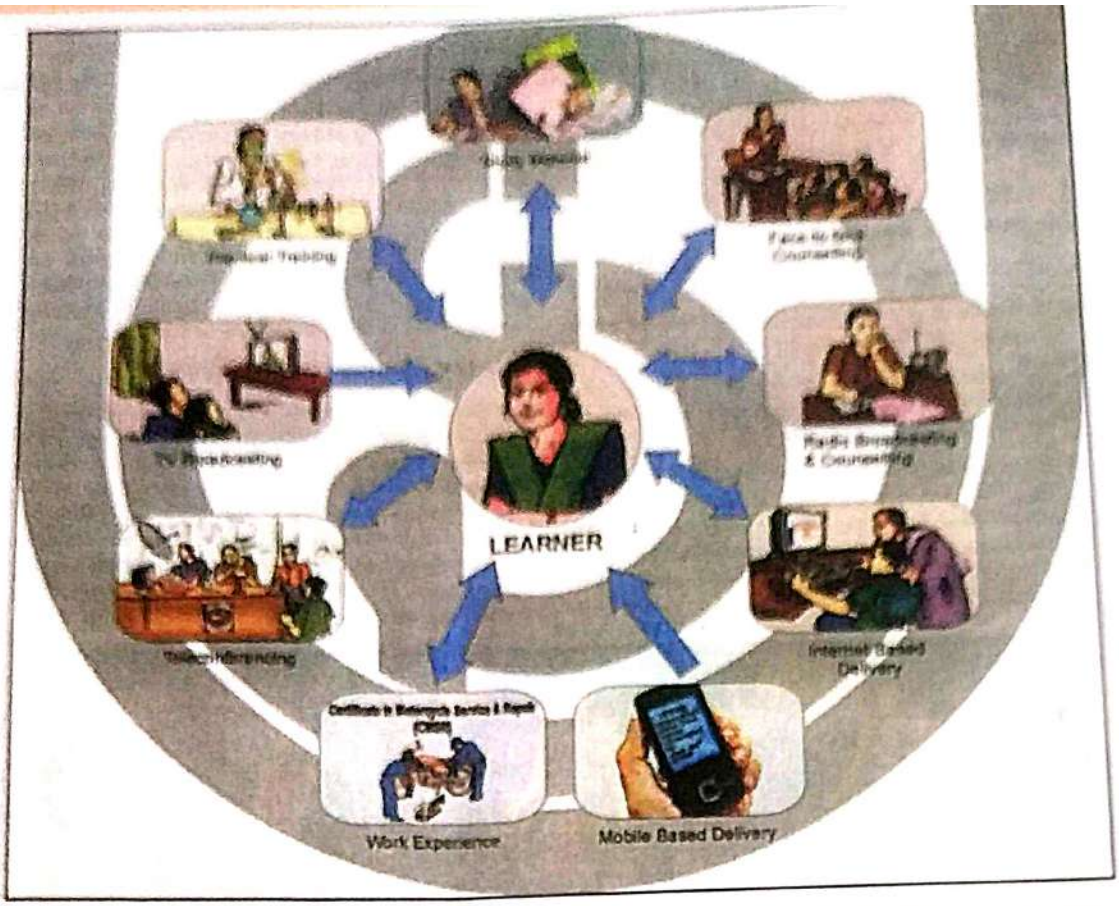


Figure 25j: IGNOU gives education through machine operated and non-machine operated tools.

COMPUTERS AS TOOLS

Clinical Care

A first basic area of computer application in nutrition practice is in clinical care in the hospital setting. The clinician is constantly involved in the basic aspects of patient care assessment, analysis, intervention, implementation and evaluation. The patient care team uses computer management system in constantly coordinating communications. This is essential in planning all aspects of patient care, including nutritional assessment and support services, nutritional analysis and nutritional therapy.

Communication in Patient Care

Computer system has applications in various aspects of patient care:

- storage and retrieval of clinical and statistical data,
- a base of educational materials that may be consulted in patient care problems,
- guidance for patient care planning,

- patient care audits to ensure quality standards and,
- clinical research.

In addition to the dietary order entry module, additional applications modules in the system support patient care; clinic scheduling/patient registration, census, financial management, clinical laboratory, electrocardiogram, medical record abstracting etc.

Nutritional Assessment and Support Services

A broad range of anthropometric, biochemical, clinical and historical data is gathered in the process of the required comprehensive nutritional assessment involved. The computer can quickly analyse these data so that the nutrition support team can screen and identify patients at risk, institute therapy and monitor individual patients closely.

Nutrition Analysis

Nutrition analysis of diets is an important basis of comprehensive nutritional assessment. Computerised nutrient analysis enables primary care clinical dietitian to obtain the necessary detailed individual patients nutrient information with speed and relative accuracy and generate reports via data processing.

Such rapid practical data processing through the computer system allows the nutrition practitioner to spend more professional time with other nutritional assessment work as well as personal interaction with the patient.

Nutritional Therapy

In the hospital setting, computerised medical records provide a basis for the nutrition staff to analyse comparative therapy for various conditions in the light of implications for nutritional status of patients and contribution to healing. The widespread hospital malnutrition of past years has been well documented.

In the special units of critical care within the hospital setting such as burn units, clinicians use continuous computer graphic programmes to monitor the nutritional status of critically ill patients. The nutrition — support team can quickly evaluate continuous nutritional needs and plan effective patient care. These bedside graphs also motivate patients and their families to work closely with the clinical dietitians to facilitate progression from a negative nutritional balance to a positive balance in early catabolic periods following massive injury.

Community Nutrition

This work involves surveys, special projects, nutritional counselling, and programme planning.

Nutrition Surveys

Various population surveys provide data for identifying nutrition needs and planning programmes to help meet these needs. Such surveys are conducted at both national and local levels. With the recent development of an optical scanning process, survey data may be read rapidly by the Optical Character Reader. It is now used by public health departments for health surveillance of population groups.

Programme-planning

Using the data from community population surveys, public health nutritionists are able to assess particular community needs and base programme planning on these identical needs. Computers are used in such analysis of data.

Nutrition Counselling

To meet special nutritional therapy needs in client – centered counselling, computer assisted programmes are developed for special clinical problems such as diabetes or hyperlipidemia. In addition to dietary analysis and calculation of individual nutrition prescription, computer-planned menus for these clients can be generated and ongoing care can be monitored.

Special nutrient data bases are constructed for such specific nutritional therapy purposes. For example, a data base used with hyperlipidemia, clients would not only list values for kilocalories, protein and carbohydrate but also give specific ratios of the total fat in terms of saturated, monounsaturated and polyunsaturated fatty acids and cholesterol. Using such a computerised nutrient data storage with an interactive retrieval programme, clinical nutritionists are able to diagnose various eating problems of their clients and plan and implement their specific food plan. The practitioner may use such an interactive retrieval system directly while interviewing clients or for followup computing of nutrient values in individual food records, family menus and recipes.

This learning process takes place in both formal school settings and in general healthcare agencies.

Educational Technology

Over the next few decades, society will increasingly rely on the computer to collect, distribute and control massive amounts of information economically. Books and journals related to nutrition can be accessed on line free or on payment.

All questions, answers, homework and project reports as well as student team messages are sent through the computer and "posted" on the electronic bulletin board for all to read. The student papers are critically evaluated by the professor on a word processor with comments written into the paper itself. Multiple copies of all instructional documents are sent to all students electronically. Students log on daily to read the bulletin board and to get any specific messages. Many messages are transmitted back and forth including notes for the bulletin board, problem statements, queries of the system staff, short assignments, team projects, messages to other faculty and others.

The computer bulletin board serves as a central information point, and its data are always available, which is especially important to students who lost assignments or who missed class. The professor is able to answer questions immediately so that students with difficulties can continue their projects without delay and assignments could be submitted in return from several locations at any hour. Through these techniques, a strong group sense is created and individualised instruction is made available according to student need.

Professional Nutrition Education

Computers combined with other audio-visual instruction techniques are used for self paced courses in nutrition offered to dietetic, nutrition, nursing and premedical students. Computer simulated clinical encounters have been used in clinical nutrition courses and found to be effective in comparison with hospital based clinical experiences. Such simulation includes a medical record with nursing care cardex for a patient, an interview with the patient, a formulatory and a nutrient catalogue. The instructor gets a printout reporting the student's knowledge, responses to inquiries concerning the patient and organisation of the clinical encounter thus enabling the instructor to meet individual student needs.

The potential use of computers in nutrition-related education is found to encompass four areas:

- Instruction—drill, practice and dialogues
- Real-life simulations
- Hypothesis/idea testing—building process models
- Reduction of computational labour.

Investigators recommend that at the minimum, students should be exposed to courses dealing with computers and information processing, especially with use of microprocessors, for the wave of the future is in wide spread multi use computers.

Patient/client education: Computer assisted learning is used in a variety of ways in private practice, clinics and hospitals for patient/client education in healthcare. For example, a computer and a programme can be used to develop a programme in diabetes education that does not require constant surveillance by the health professional. In addition to such specific programmes written by nutritionists to meet special learning needs, a number of general diet and exercise programmes are available for use in professional healthcare services.

Consumer education: In future computers may become a major tool for both food marketing and client nutrition education. Consumers can view the entire product lists of grocery stores on the monitor, compare prices and select the local store offering the lowest total cost of the day. Payment transaction can also be done through computer. Reductions of in-store advertising and resultant impulse buying would drastically affect food company marketing programmes. 'User friendly' ordering will offer the consumer the advantages of reduced shopping time and product costs. Opportunity for involvement of consumer nutrition education in such programmes is indeed vast.

Nutrition Research

General research projects can be greatly assisted by computers. In metabolic clinical research, for example, the diets used must satisfy both the nutrient specifications of the research protocol and satisfy the individual subject's nutrient requirements and preferences. Computer-based nutrition research involves selecting and using data bases, developing literature search strategies and writing resulting reports.

Use of data base: More information is available through a computer ... any library in the world. A number of computerised nutrient data banks are available for use in nutrient analysis, surveys and research projects. In addition, a large number of data bases exist for searching the scientific literature, on any desired topic such as EXCERPTA MEDICA and MEDLINE, CINAHC, AGRICOLA, BIOSIS, SCISEARCH etc. These files make available a variety of materials including scientific journal articles, monographs, proceedings of conferences and many other documents. Bibliographic and referral data bases can be searched via one or more of the three major, information service vendors-DIALOG, BRS etc. Proliferating traditional scientific journals have become increasingly specialised and expensive. Electronic journals give speedy scientific reports.

COMPUTER APPLICATIONS

Computer applications have multiplied so rapidly that the heart of its technology—tiny miracle chips—now touch almost all aspects of our lives. Computer literacy is becoming increasingly essential not only in personal lives but also in professional practice. In healthcare and nutritional care in particular, management information systems require both the development of the components to meet our needs and our ability to use them with skill and wisdom.

STAND-ALONE APPLICATIONS

'Stand-alone' applications are computer programmes that run without connection to a network or modem. These applications have been designed to provide information and training in nutrition education for the public, the paraprofessional and the professional. The major types of programmes designed for both professionals and consumers include data collection, nutrition analysis, food service and recipe management. Those programmes which help in analysing nutrient intake are welcomed by researchers and dieticians who found that these programmes significantly reduced both the time and efforts of calculating intake.

Nutrient Analysis: The programme calculates the nutrient intake of individuals or groups of individuals and compares it to a nutrient standards. Computerised data base for food consumption information are available from FAO as well as other international organisations. The International Network of Food Data Systems has food composition databases organised for regions of the world.

Programmes that analyse nutrient intake are useful for researchers and hospital dietitians. They found computerised nutrient analysis significantly reduced both the time and effort of calculating intakes using calculators and food composition books.

The programmes have been used extensively for classroom assignments from elementary through medical school students and have been offered as a nutrition education service in shopping malls and health fairs, in science exhibits and by public health professionals, fitness trainers, food scientists and food service professionals. The programmes are used in physician

offices as part of a medical assessment or nutrition counselling session. The popularity of these diet analysis programmes continues to grow as consumers become aware of the relationships between food intake and health and want to tailor their own dietary intake (*e.g.*, to be lower/higher in calories or fat).

The effectiveness of these programmes in computing nutrient intake for research and education purposes, identifying nutrient excesses and deficiencies, and teaching food composition to varied audiences is well documented. The speed of calculation has allowed nutrient analysis is to be used more frequently in education and counselling settings.

Food frequency questionnaires: The FFQ is a short-cut method for collecting information about dietary intake. First, computerised software made it possible to easily estimate reliable nutrient intakes.

"Nutrition Discovery" is a CD-ROM available. It is based on the health habits and history questionnaire, dietary analysis system. Rather than selecting from a list of foods, the user identifies the foods eaten from 100 food items shown in colour on the screen. The user is asked the quantity and frequency of only those foods selected.

It is expected that multimedia programmes when compared with pencil and paper or partially automated questionnaires will result in more reliable data because serving sizes are represented better. The programme also allows collection of dietary data when the expert interviewer is unavailable or unaffordable.

Food service and recipe management, menu planning: Basic software programmes used for nutrient analyses are used for these functions. Additional functions generate nutrient analyses, costing and quantity conversion of recipes, food production reports, inventory listing and purchasing.

One example of a consumer version of menu-planning multimedia software delivered on floppy disk is "Ready, set, Dinner". This software was developed for use in a communication programme designed to increase the consumption of fresh potatoes. Multimedia menu-planning software allows the users to easily search a library of 40 recipes, create menus and shopping lists, find nutrition information, use graphics, music and animation.

Nutritionists suggest that this type of programme may help individuals follow dietary guidelines. The programme demonstrates a benefit of computer application, that is, providing information when and where the public wants it.

Clinical Nutrition

Assessment tools: Applications that use computer capabilities in calculation and data management are widely available. Software for desk-top computers and programmes for hand-held computers are useful for many formulas used in nutrition assessment, including basal metabolic energy needs, Body Mass Index, desirable body weight, nitrogen and diabetic

food exchanges. These tools are useful in hospital and community research and service settings. They allow the use of more precise calculations rather than "rule of thumb" calculations with fewer errors in making decisions about nutrition care. These tools can be less cumbersome than manuals.

Nutrient drug interaction: This software is an example of a specialized data base for clinical nutrition. It allows the users to quickly assess any nutrient that may be compromised with a medication regimen. These aids make it more likely that interactions will be considered when prescribing medicines.

Patient education: Programmes to provide dietary information and education to patients are available for individuals with diabetes, hypertension heart disease and complex medication regimens. These programmes teach about causes of the disease, symptoms, complications, dietary management and menu-planning.

Computer-assisted instruction for health professionals: The nutrition programmes available generally include content such as the relationship of diet to a disease, components of nutritional assessment, diet history methods and patient case studies. Users have found text-on-screen applications valuable for the immediate feedback provided by drills and quizzes.

Text-on-screen examples: "Nutrition and the Practicing physician" is an example of a computer assisted instruction programme that addresses both the prevention and management of disease including obesity, hypertension, diabetes and lipid disorders. The programme provides nutrition information and counselling strategies known to foster a positive physician/patient relationship.

Multimedia examples: One of the few nutrition interactive videodisc programmes produced is "cardio vascular health: Focus on Nutrition, Fitness and Smoking cessation". The technology is used for role modelling. Physicians are seen completing nutrition assessments and counselling their patients in ambulatory clinics. This is useful if subject matter experts are scarce.

Application to distance learning: Computer assisted instruction CAI is a distance learning approach. Computer based case studies teach the learner nutrition assessment practices, perform assessment tasks and interpret results. Here the lecturer becomes a guide.

Production Tools

Computer tailored messages: Word processing and desk-top publishing software enable nutrition educators without computer programming expertise to develop print materials personalised for their audiences. The programme eliminates extraneous material and presents only the information most relevant to the user.

Tailoring graphics for nutrition education: The American Dietetic Association prepared and distributed floppy disks with patient education handouts in files. Nutrition education

programme developers could use this approach to design materials that would be tailored and printed at the delivery site.

The National Institute of Nutrition has brought out CDs related to Nutrition and Health in English and regional languages.

Clip art and photo collections: Users can access professional art illustrations at low cost. These programmes can produce the graphics for print or slide or computer presentation.

Reading level evaluation: Nutrition educators use software programmes to evaluate reading grade. Electronic publishing improves access to information.

Presentation software: Presentation software allows nutrition educators with multimedia computers to enhance their presentations by incorporating visuals, sound, animation, texts and video. Nutrition instructors at many colleges and universities are beginning to use presentation programmes to enhance their lectures.

Nutrient Database

The database programme, which is categorized by food groups, allows users to scroll through an alphabetised list of foods and gives consumers information on approximately 30 nutrients in each food listed. It also includes a handy "portion modifier" feature that allows consumers to adjust the given portion size, either upwards or downwards, to the portion size that they would ordinarily eat.

Doctors can also use the database to recommend low-sodium foods to patients with heart conditions or to help their patients choose foods that are appropriate for their weight loss plan.

The database will also soon be available for down loading on to personal computers. Consumers who own hand-held personal digital assistants with the palm operating system can download the software in about 30 seconds from www.nal. usda.gov/fnic/foodcomp.

ON-LINE APPLICATION

On the web, one can be a seeker or a provider of information. Nutrition educators from different parts of the world are using e-mail to exchange ideas, projects and data easily, quickly and inexpensively. The Internet has become a very popular forum of communication, which allows researchers to carry out surveys. Discussion groups and chat rooms on specialised nutrition issues could be created to exchange ideas and seek solutions. The advantage is the informality that goes with it and all this happens in real time irrespective of distances. Using multimedia and web, nutritional brochures could be designed attractively and meaningfully and distributed instantaneously to a large group. Web offers not only freedom but also privacy. Information could be protected using passwords at will.

Nutrition Research on the Internet

In seeking out new information on the Internet, while at the same time attempting to separate hearsay, anecdotal reporting, and quackery from authentic information, one should ask him or herself the following questions:

- *What is the source of the website?* Most websites have owners and/or sponsors who may have a proprietary interest in promoting a product or agenda. Also, because the web is worldwide, some Websites originating in another country may use different guidelines or principles. The source is always posted, sometimes in small print at the bottom of the home page.
- *Who are the contributors?* Nutritionists and health care professionals should be prominently listed as contributors to a website. For example, the website *on health.com* has a page listing the contributing members of its medical advisory board.
- *Is the website efficiently managed?* The site should be frequently updated. Generally, the most recent updates are posted. Within the limits of the computer used, it should be quick and easy to move between pages. There should also be a 'search' component to access all the resource information of the website.
- *What links to other websites and databases are provided?* There should be links to other reputable professional sources of information such as the National Library of Medicine's MEDLINE, which holds records and abstracts from over 3,500 medical journals and other publications. Databases that are accessed should provide abstracts of the research publications. In some cases, it is possible to order complete articles on-line.

Research on the Internet is novel, convenient, and appealing, but it should be remembered that it is simply a technologically advanced medium designed to disseminate vast amounts of information to, in many cases, unwary users. The information it provides must be evaluated for authenticity at least to the same degree as information accessed through the more traditional library search.

Source: Groft James L and Sarees S. Gropper, 1999, *Advanced nutrition and Human metabolism*, Wadsworth.

Mobile Applications

A mobile app is a computer program designed to run on smartphones, tablet computers and other mobile devices. Apps are usually available through application distribution platforms, which began appearing in 2008 and are typically operated by the owner of the mobile operating system, such as the Apple App Store, Google Play, Windows Phone Store, and BlackBerry App World.

In the recent times, smart phones have many software applications and is user friendly providing nutrition information about the foods eaten and even provide healthier alternative

to help make changes gradually. Nutrition apps are engaging tools that help people more interested in adopting healthful eating habits and dieticians can recommended to their clients for motivating them to stay on track with a nutritious diet. These phones also give information on energy expenditure through the pedometer app.

Nutrition on Web

Nutrition on web is a mind-boggling load of information that can be used to seek answers to almost any nutritional topic. Web can be a very useful tool to supplement the efforts of paranutritionists and to help remote healthcare centres. Though initial investment of establishing networks, at village, mandal, district and state levels, may seem discouraging, in terms of finances and training, the investment could definitely pay off in forecasting, and preventing nutrition related problems. Nutrition web would have to be run by professionals in the field of nutrition science. The site can develop programmes catering to school children, illiterate people, senior citizens, clinicians and paraprofessionals.

There are several computer based programmes on nutrition which are interactive, informative and interesting. There are many online courses on Nutrition offered by universities like Harvard. Many such courses are offered free of cost. Web conferencing refers to a service that allows conferencing events to be shared with remote locations. These are sometimes referred to as webinars or for interactive conferences and for on line workshops.

Food and Nutrition On-line Services

Electronic databases are collections of information, usually covering a specific subject, that are arranged to facilitate efficient retrieval and use of information. The Food and Nutrition Information Center (FNIC) of the United States Department of Agriculture (USDA) has been a leader in cataloguing food and nutrition sources available electronically. FNIC maintains a listing of about 200 programs that are accessible to the public.

Computer on-line services offer fast, low-cost access to much of the world's accumulated nutrition and medical wisdom. An on-line service is much like a personal librarian who can instantly retrieve abstracts, material can be read on screen or printed.

Electronic Bulletin Board Systems

Bulletin board systems provide access to publications, bibliographies, software, calendars, bulletins and other resources on specific subjects for target audiences. For instance, USDA provides a bulletin board called Agricultural Library Form (ALF), the Nutrient Data Bank Bulletin Board and a database featuring nutrition education materials with the United States Food Guide Pyramid, The United States Food and Drug Administration maintains a bulletin board with food labelling, food safety and food regulation information. The Technology

Transfer Automated Retrieval System (TEKTRAN), sponsored by the Agricultural Research Service of USDA, contains information about the latest studies in agriculture, food and nutrition, giving research results and interpretive summaries.

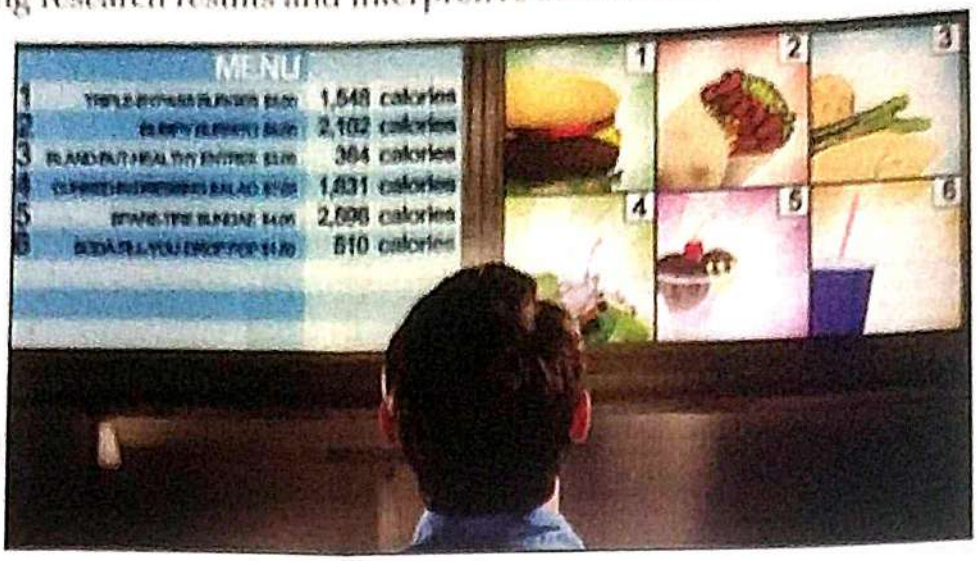


Figure 25k: Electronic board helps in choosing the menu.

Computer Conferencing

Computer Conferencing, which simulates person-to-person conferences, offers different levels of interaction and different kinds of scheduling. It allows individuals to identify new resources and contacts, interact with colleagues, improve knowledge, develop professionally and take courses at their convenience. Although small cameras are available that allow each participant to see others, most computer conferencing is currently limited to text exchanges, with computer conferencing, several people can communicate with each other at a designated time by logging on to their computers and typing to each other.

Interactive Television

The use of interactive television (ITV) for educational and health services is growing. ITV requires either satellite transmission or sophisticated telephone lines to provide several levels of interaction. Telemedicine uses telecommunication technologies to deliver medical information and clinical consultation. It typically involves two-way video and two-way audio, enabling diagnosis, treatment and counselling.

Telemedicine can extend the expertise of health care professionals to rural clinics, nursing homes and ultimately individual homes in addition to being used for meetings and training.

ITV offers great potential for distance learning in public health and nutrition. Several public health and cooperative extension nutrition programmes have used satellite television to extend the reach of courses or workshops. These programmes allow field workers to obtain important training without being away from their jobs for long periods. Students are able to interact by telephone, and local workshops often supplement the broadcasts.

Access and Training

Nutrition educators need to be informed and to participate in discussions of access to information technology. Questions are often raised about the availability of equipment and required skills. In developed and developing countries it is common for projects and programmes of all sizes to have a computer, yet the capabilities of most computers are not fully utilized. Nutrition educators need training and time to practise desktop publishing and other stand-alone applications.

For cyberspace access, the concerns at first appear to be more serious, especially where telephone lines are unreliable. Some professionals in developing countries are finding ways to obtain access to e-mail, and alternatives to traditional telephone systems are being developed. In places where fax transmissions are possible, the simple addition of a modem and computer with communications software may communicate faster and less expensive than faxing.

The computer provides many opportunities for nutrition education. To date, only a limited number of stand-alone programs have been developed and evaluated, and participation of nutrition educators in on-line applications has been minor. Nutrition educators should participate in health related discussion groups to create a presence for nutrition.

While computer technology is a powerful tool which can enhance the efforts of nutrition educators, all forms of communication can be effective, and in some situations other means may be more appropriate. It is important to determine how the intended audience learns and then to design programmes and campaigns that use a combination of media.

Computer can do many jobs in handling a wealth of information in numbers and words to reshape work, relieve us of tedious labour and provide greater opportunity to work directly with patients and clients. What computers cannot do is supply the human factor. There is need to learn how to use these revolutionary tools with skill and wisdom in providing sensitive, sound and humanistic healthcare.

Suggested Readings

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- Publications and CDs on micro nutrients www.micronutrient.org.
- Food processing CD: www.learningseed.com
- New fears for food, old foes: a new threat: CD www.cambridgeeducational.com