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"Medical Information & Technology: Rapidly Expanding Vast Horizons"

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ABSTRACT: During 'Medical Council Of India', Platinum Jubilee Year (1933-2008) Celebrations, In Year 2008, Several Scientific Meeting/Seminar/Symposium, On Various Topics Of Contemporary Importance And Relevance In The Field Of 'Medical Education And Ethics', Were Organized, By Different Medical Colleges At Various Local, State, National Levels.
The Present Discussion, Is An Comprehensive Summary Of Various Different Aspects of "Medical Information Communication Technology", Especially UseFul For The Audience Stratum Group Of Those Amateur Medical & Paramedical Staff, With No Previous Work Experience Knowledge Of Computronics Applications. Outlining The, i.Administration Applications: Medical Records Etc, ii. Clinical Applications: Prospective Scope Of Tele-Medicine Applicabilities Etc iii. Other Applications: Efforts To Augment Improvement Of Medical Education, Medical Presentations, Medical Education And Research Etc.

'Medical Trancription' & Related Recent Study Fields e.g 'Modern Pharmaceuticals','Bio-Engineering', 'Bio-Mechanics', 'Bio-Technology' Etc., Along With Important Aspects Of Computers-General Considerations, Computer Ergonomics Assembled To Summarize, The AwareNess Regarding Basic Fundamentals Of Medical Computronics & Its Practically SuccessFul Utilities.

KEYWORDS: Medical Transcription, Administrative, Clinical, Medical Education & Research Applicapabilities, TeleMedicine, Computer Assisted Instruction (CAI), Computer Assisted Teaching(CAT),Computer Assisted Learning (CAL),
Computer Managed Learning(CML), Computer Ergonomics.

INTRODUCTION

The Information Technology Revolution Era, Is In Process Of Virtual Invasion Of All Fields Of Health Care Systems.
Computerization With Definite Convincing Benefits Of Improved Efficiency, Accuracy, Effective Time And Financial Management,
Led To Better Utilization Of Resources, With Rewarding Advantage Of Modernization Of Health Services Image, Found Definitive , Diverse Applications In The Large Consumer Oriented Field Of Health Sector.

DISCUSSION

'Medical Transcription': A Skill, Worth Recognizition, Involves The Knowledge Of Computing All Necessary DataBases, Dealing Medical & Health Care, Medical Education & Research At Various Local, State, National & InterNational Levels Along With The Various Different Aspects Of Administration Prospectives Etc.
The Versatile Variations Of Computronics Applications To Health, Medical Education & Research Related Fields, Can Be Summarized As Follows-

(A) ADMINISTRATION APPLICATIONS :-Issues Like Patient Appointments, Follow Up /Missed Up Visits, Billing & Accounts, Drug Inventories, Purchase, Supplies, Human Resources Department, Correspondence, Medical Statistics & Records, Promotion, Advertisements, Local Area Networking (LAN).

(B) CLINICAL APPLICATIONS:-

1.Prescriptions :-Advantages Of Legibility, Clear & Decent Looks, Automatic Calculation Of Drug Dosage, Printed Relevant Instructions , Important Side Effects & Drug Interactions.
The AvailAbles Include:
-InterNet DataBases;MedMARx,
-CompleteDrug Reference Guide;
ePocrates'qRx
-Web Based Electronic Prescription Writing Service; Script Lynx
-Electronic Patient Record(EDR)

2. Investigations :-Computerized Diagnostic Procedures With Computer Generated & Interpreted Reports , Are Comparatively Better Accepted.

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3. Computerized Medical records (Data Base):- More Efficient,Useful, Extremely Helpful For Statistical Analysis, Medical Audit, & Medico Legal Purposes Due To Uniform Pattern Storage & Thus Easy Retrieval, If Need .

4. Patient/Personnels Education:-Important Tools For Health Education, Public Awareness On Health & Disease e.g Diet, Immunization, First Aid Measures And Stress Management.

5. ICU/ICCU:- Intensive Care Units At Various Levels, Of Different Needs, Are Well Equipped, With Computronics, To Available Resources.

6.Indoor Patients Care :-Computerized Indoor Records Including Clinical History, Clinical Examination, Investigations, Treatment Especially Drug Dosage, Surgical Procedures, Provide Helpful, Better Patient Monitoring .

(C) OTHER APPLICATIONS:-

1. Internet & E-mail :Access To Updated Information, With Integrated Document Management Systems, Instantaneously Across The World.

2. Telemedicine :- Exchange Of Medical Information Over A Distance.
The Use Of Medical Information Exchanged From One Site To Another Via Electronic Communication For The Health And Education Of The Patient Or Health Care Provider And For The Purpose Of Improving Patient Care.
Scope Of Telemedicine :- Includes
I.Tele Consultation II. Tele Education
III. Tele Monitoring IV. Tele Surgery.
Robots Assisted Remote Telesurgery & Others, The Various Different Dreams Are In Process Of Realization.

Advantages Of TeleMedicine;
1. Resources Utilization
2.Early Intervention
3.Avoids Unnecessary Transportation 4.Community Based Care
5.Medical Education & Research
6.Cost Saving
7. Improved Patient Documentation
8.Increased Range Of Care & Education

Data Used In TeleMedicine: Have The Limitations Of Transfer By Available Digital Signals, FrameRate, BandWidth & Available Transmission Modalities

The Different Used Datas Are;
1. Text 2. Audio
3. Still Image 4. Video Image

Telemedicine Technologies:
I. Store & Forward
II. Real Time TeleMedicine
III.Video Conferencing

Telemedicine Devices:
(A.) Video Conferencing System;Roll About Systems, Set Top System, Desk Top Systems
(B.) Peripheral Devices;
1. Medical Peripherals
2. Non-Medical Peripherals

Limitations To Spread Of TeleMedicine:
1. Poor Patient- Doctor RelationShip
2. Patient Aceeptance
3. Fear Of Technology
4. Low Rate Of Utilization
5. InfraStructure

Ethical Issues In TeleMedicine: Are
- **Doctor Patient RelationShip, The Confidentiality Of Patient Data,**
- **The Standard Of Care,**
- **The Liability Of The Physician**

& Physician Accreditation.

3. Medical Presentations:
Symposiums, Seminars, Demonstrations, Conferences in various different strata gatherings, witnessed Convincingly accepted gradual changes from Slides Projections, 'Desk Tops' Or 'Lap Tops' Operated CDs, CDRoms ,
To The Recently Available Pen- Drives,
Likely The Available More Sophisticated Audio-Visual Aids Enhances The Range,
Speed & Depth Of Presentations
& Thus The Overall Out Come.

4. **Medical Education And Research :-**

(A)MEDICAL EDUCATION:

Multi Media Computerization Revolutionized The Field Of Education Technology, But Are No Complete Replacement Of A Good Teacher, Because Of Class Room Environment, Psychomotor Skills Development, Audience Quality & Quantity, Factors.

Computer Assisted Instruction (CAI) :-
The Variably Different 'Instructions', Are Made Available To The Reach Of Students By Audio-Visual Appliances.
Computer Assisted Teaching(CAT) :- 'No Good Teacher Can Ever UnderMine Role Of Computer, As Partner In Education', Gradually Enchancing Justifications To The Statement, Have Become Well Established Facts Today.
Computer Assisted Learning (CAL) :-
The Various Components Are-

- **(A) Instructional; Identical To CAI & Is An Important Teaching Method, eg MCQ Sessions**
- **(B) Revelatory; The Subject Matter Is Revealed To The Student In A Gradual Discovery Learning Approach, By Computer Guided Gradual Revealations.**
- **(C) Conjectural; An Extension Of Revealatory Pattern, Computer Is Used To Formulate And Test Ideas & Hypotheses To Obtain Solutions To Varied Problems.**
- **(D) Emancipatory; Methodolgy Avoids Non-Essential Labour Of The User, By Providing ReadyMade Answers To To Versatile Problems, & Assist The Student To Concenterate Upon The Logistics Of Case Analysis.**

Computer Managed Learning(CML): The Tidious & Time Consuming Managerical Task Of Learning Are Done By Computer.
The Different "Comparative Evaluatory Assessments", Conducted For The Evaluation Of Recently Evolved Computronics Assisted 'Teaching & Examination Methodologies', Using Audio-Visual Aids Etc., With The Classical Black-Board & Chalk Teachings & Examinations Conducted,
Revealed A Significant Increase In The Level Of Understanding Of 'Subject Topics' By Students, When Computronics Aids-Transparencies Projections, Complicated Study Material Flow Diagrams & Other Important Relevant Study Materials Were Demonstrated & Later Available To Them As Photocopies & Or Other Forms,
While The Recent Computronics Assisted 'Examination Methodologies' Have The Obviously DemonstratAble Advantage Of Discrete Evaluatory Assessment Of The Students, With Regards To Theoritical Knowledge & Practical Aspects Of The The 'Subject Topics'.

The Recent Advent & Success Practical Use Of 'On-Line Examination Technique Methodology',
Can Be Sucessfully Implied At Various Different Stratum Of Vast & Vivid 'Educational System',
Depending Upon The Availability Of Resources: ManPower, Infra-Structure Etc.,
Will Be Able To Deliver UnBiased Assessments Of The Examinees, Attaining Practical SuccessFullness, In the Near Future.

(B) MEDICAL RESEARCH:
Computerized Bibliographic Search Virtually Eliminated 'Index Medicus' Use , In Medical Literature On Health & Medical Sciences.

The National Library Of Medicine ,USA Computer Based Medical Literature Analysis & Retrieval System (MEDLARS) Being Used In For Store & Access Of Bio Medical Information.
Other Data Bases Include:

- **POPLINE For Family Planning & Contraception,**
- **AIDSLINE On Aids& HIV,**
- **TOXINET On Toxicology.**
- **Cochrane Library Is Quite Informatory With Collection Of DataBases.**

EPIINFO By WHO For Medical Research, STATCALC, ANOVA Test Being Other Software Packages Besides Internet Resourcing For Various Available Medical Journals & Books.

COMPUTER ERGONOMICS: Endeavors To Provide, A Guide To Healthy & Productive Usage Of PC, With Blue Prints To Prevent, Detect Early, & Treat Computer Usage Related Clinical Syndromes, Including-

(A.)Physical e.g. Computer Induced Repetitive Stress Injury (CIRSI), Or Cumulate Trauma Disorders (CTD) & Computer Vision Syndrome (CVS), Musculo-Skeletal Neurological Symptoms Affecting Some Body Parts,

(B.) Mental Illnessness e.g Depression, Net Addiction, Social Disassociation, Over Dependency.

Causes Of Computer Related Illnesses:

- **Prolonged Hours Of Use, Without In Between Respite,**
- **Obesity, Lack Of Physical Exercise In General,**
- **Not Proper Ergonomic Furniture, Work Station Design,**
- **Electromagnetic Fields,**
- **Disregard To Previous Associated Medical Problems.**

Prevention Of Computer Related Physical Ailments:

(A)Work Station Design;

Ergonomic Furniture-

- **Appropriately Designed Chair With Person's Use Adjustment Guidance**
- **Monitor, Key Board, Pointing Devices,Wrist Support, Copy Holder, Light Sources Proper Adjustments.**

(B) Exercises Aimed At-

- **Improved Blood Circulation,**
- **Relief From Muscle Tension Or Fatigue, Strengthen Muscles & Ligaments,**
- **Improve OverAll Productivity And Efficiency At Work By; Regular Back, Hand, Wrist & Elbow, Eye, Neck & Shoulder Exercises**

COMPUTER GENERAL CONSIDERATIONS:With The Fundamental Practical AwareNess Of Computer Hardware, Software, Maintainence, Security, Viruses, & Latest Available Net Policing Devices Etc., Need Proper Attention & Continuous Vigilance.
The Immediate Need Of Computer Working Knowledge Includes: -Web Browsing,
-E-Mail, Mailing List, New Groups, Bulletin Board And Chat
-Search The InterNet & MedLIne
-Technique To Establish A Good Web- Site
COMPUTER APPLICATIONS OF THE FUTURE:
Possible Aspects Include Theorized 'Personal Diagnosis System', 'Artificial Intelligence' , 'Human Reasoning And Senses'
& Several Others.

CONCLUSION

As With The History Of Inventions Every New Technology Making It Self Relevant To A Particular Need, Is Quickly Incorporated In To The System, Making The Precedence Obsolete. Thus, May Be True With Radical Transformation Of Medical & Health Technologies,
To Variable Extents.
Beside 'Medical Transcription': Related Recent Medical Study Fields Including;
'Bio-Engineering','Modern Pharmaceuticals', 'Bio-Mechanics', 'Bio-Technology' Etc.,
Are At Continuous HardWork For Better ManKind Health, While Simultaneously

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