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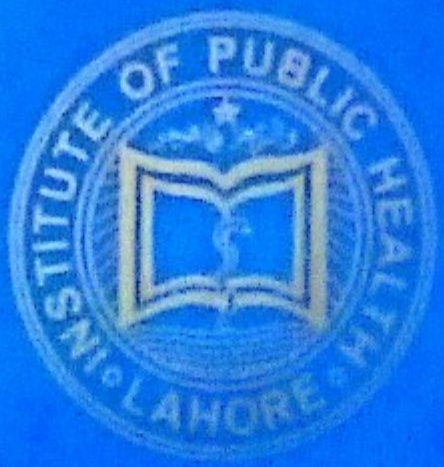

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CONTENTS

UNIFORM REQUIREMENTS FOR MANUSCRIPTS SUBMITTED TO BIOMEDICAL JOURNALS

In the 18 years since it was first published, the "uniform requirements for Manuscripts submitted to Biomedical Journals"(the Vancouver style), developed by the International Committee of Medical Journal Editors (ICMJE), has been widely accepted by both authors and editors; over 400 journals have stated that they will consider manuscripts that conform to its requirements. This is the fourth edition of the Uniform Requirements, the first to be published in the Journal, which now serves as coordinator of the ICMJE in North America.

International Committee of Medical Journal Editors
Members of the committee are Suzanne and Robert Fletcher (Annals of Internal Medicine), Laurel Thomas (Medical Journal of Australia), Stephen Lock (British Medical Journal). George D. Lundberg (Journal of the American Medical Association). Robin Fox (Lancet), Magne Nylenna (Tidsskrift for den Norske Laegeforening), Lois Ann Colaianni (Index Medicus), Amold S. Relman and Marcia Angel (New England Journal of Medicine). Povl Riis (Journal of the Danish Medical Association, Danish Medical Bulletin), Richard G. Robinson (New Zealand Medical Journal), Bruce P. Squires. (Canadian Medical Association Journal), and Linda Clever (Western Journal of Medicine), Address correspondence to Editor, the New England Journal of Medicine, or Editor, British Medical Journal.

In January 1978 a group of editors from some major biomedical journals published in English met in Vancouver, British Columbia, and decided on uniform technical requirements for manuscripts to be submitted to their journals. These requirements, including formats for bibliographic references developed for the Vancouver group by the National Library of Medicine, were published in three of the journals early in 1979. The Vancouver group evolved into the International Committee of Medical Journal Editors. Over the years, the group has revised the requirements slightly; this is the fourth edition.

Over 400 journals have agreed to receive manuscripts prepared in accordance with the requirements. It is important to emphasize what these requirements imply and what they do not.

First, the requirements are instructions to authors on how to prepare manuscripts, not to editors on publication style. (But many journals have drawn on these requirements for elements of their publication styles.)

Second, if authors prepare their manuscripts in the style specified in these requirements, editors of the participating journals will not return manuscripts for changes in these details of style. Even so, manuscripts may be altered by journals to conform with details of their own publication styles.

Third, authors sending manuscripts to a participating journal should not try to prepare them in accordance with the publication style of that journal but should follow the "Uniform Requirements for Manuscripts Submitted to Biomedical Journals.

Nevertheless, authors must also follow the instructions to authors in the journal as to what topics are suitable for that journal and the types of papers that may be submitted — for example, original articles, reviews, or case reports. In addition, the journal's instructions are likely to contain other requirements unique to that journal, such as number of copies of manuscripts, acceptable languages, length of articles and approved abbreviations.

Participating journal are expected to state in their instructions to authors that their requirements are in accordance with the "Uniform

Requirements for Manuscripts Submitted to Biomedical Journals" and to cite a 'Published version.

This documents will be revised at intervals, inquiries and comments from Central and North America about these requirements should be sent to. Editor, the *New Englands Journal of Medicine*, 10 Shattuck St,. Boston, MA 02115; those from other regions should be sent to Editor, *British Medical Journal*, British Medical Association, Tavistock Sq,. London WCIH 9JR, United Kingdom. Note that these two journals provide secretariat services for the International Committee of Medical Journal Editors; they do not handle manuscripts intended for other journals. Papers intended for other journals should be sent directly to the offices of those journals.

Summary of Requirements

Type the manuscript double-spaced, including title page, abstract, text acknowledgments, references, tables and legends.

Each manuscript component should begin on a new page, in the following sequence; title page; abstract and key words; text; acknowledgments; references; tables (each table complete with title and footnotes on a separate page); and legends for illustrations.

Illustrations must be good-quality, unmounted glossy prints. usually 127x173 mm (5x7 inch.), but no larger than 203x254 mm (8x10 inch.)

Submit the required number of copies of manuscript and figures (see journal's instruction) in a heavy paper envelope. The submitted manuscript should be accompanied by a covering letter, as described under Submission of Manuscripts and permissions to reproduce previously published material or to use illustrations that may identify human subject.

Follow the journal's instructions for transfer of copyright. Authors should keep copies of everything submitted.

Prior and Duplicate Publication

Most journals do not wish to consider for publication a paper on work that has already been reported in a published paper or is described in a paper submitted or accepted for publication else where. This policy does no usually preclude consideration of a paper that has been rejected by another journal or of a complete report that follows publication of a preliminary report, usually in the form of an abstract.. Nor does it prevent consideration of a paper that has been presented at a scientific meeting if not published in full in a proceedings or similar publication. Press reports of the meeting will not usually be considered as breaches of this rule, but such reports should not be amplified by additional data or copies of tables and illustrations. When submitting a paper an author should always make a full statement to the editor about all submissions and previous reports that might be regarded as prior or duplicate publication of the same or very similar work. Copies of such material should be included with the submitted paper to help the editor decide how to deal with the matter.

Multiple publication--that is, the publication more than once of the same study, irrespective of whether the wording is the same -- is rarely justified. Secondary publication in another language is one possible justification, provided the following conditions are met.

1. The editors of both journals concerned are full informed; the editor concerned with secondary publication should have a photocopy, reprint, or manuscript of the primary version.
2. The priority of the primary publication is respected by a publication interval of at least two weeks.
3. The paper for secondary publication is written for a different group of readers and is not simply a translated version of the primary paper; and abbreviated version will opted be sufficient.
4. The secondary version reflects faithfully the data and interpretations of the primary version.
5. A footnote on the title page of the secondary version informs readers years and documenting agencies that the paper was edited and is being published, for a national audience in parallel with a primary version based on the same data and interpretation. A suitable footnote might read as follows: this article is based on a study first reported in the [title of journal, with full reference]

Multiple publication other than as defined above is not acceptable to editors. If authors violate this rule they may expect appropriate editorial action to be taken.

Preliminary release, usually to public media, of scientific information described in a paper that

...ccepted but not yet published is ... policies of many journals. In a few ... by arrangnment with the editor, preliminary release of data may be acceptable -- for example, to warn the public of health hazards.

Preparation of Manuscript

Type the manuscript on white bond paper, 216 x 279 mm (8 1/2 x 11 inch.) or ISO A4 (212 x 297 mm), with margins of at least 25 mm (1 inch). Type only on one side of the paper, Use double spacing throughout including title page, abstract, text acknowledgment references, tables and legends for illustrations. Begin each of the following sections of separate pages: title page, abstract and key words, text, acknowledgments, references, individual tables and legends. Number pages conclusively, beginning with the title page. Type the page number in the upper or lower right hand corner of each page.

Title Page

The title page should carry (a) the tile of the article, which should be consist but informative; (b) first name, middle initial and last name of each author, with highest academic degree(s) and institutional affiliation; (c) name of departments(s) and institution(s) to which the work should be attributed; (d) disclaimers if any; (e) name and address of author responsible for correspondence about the manuscript; (f) name and address of author to whom requests for reprints should be addressed or statement that reprints will not be available from the author; (g) source(s) of support in the form of grants, equipment, drugs, or all of these; and (h) a short running head or foot line of no more than 40 characters (count letters and spaces) placed at the foot of the title page and identified.

Authorship

All persons designated as authors should qualify for authorship. The order of authorship should be a joint decision of the coauthors. Each author should have participated sufficiently in the work to take public responsibility for the content.

Authorship credit should be based only on substantial contributions to (a) conception and design, or analysis and interpretation of data; and to (b) drafting the article or revising it critically for important intellectual content; and on (c) final approval of the version to be published. Conditions (a), (b), and (c) must all be met. Participation solely in the acquisition of funding or the collection of data does not justify authorship. General supervision of the research group is also not sufficient for authorship. Any part of an article critical to its main conclusions must be the responsibility of at least one author.

A paper with corporate (collective) authorship must specify the key persons responsible for the article; other contributing to the work should be recognized separately (see Acknowledgments).

Editors may require authors to justify the assignment of authorship.

Abstract and Key Words

The second page should carry an abstract (of no more than 150 words for unstructured abstracts or 250 words for structured abstracts). The abstract should state the purposes of the study or the investigations, basic procedures (selection of study subjects or laboratory animals; observational and analytical methods) main findings (give specific data and their statistical significance, if possible and the principal conclusions. Emphasize new and important aspects of the study of observation.

Below the abstract provide, and identify as such, 3 to 10 key words or short phrases that will assist indexers in cross indexing the article and may be published with the abstract. Use terms from the medical subject headings (MESH) list of *Index Medicus*; if suitable MESH term are not yet available for recently introduced terms, present terms may be used.

Text

The text of observational and experimental articles is usually but not necessarily divided into sections with the headings Introduction, Methods, Results, and Discussion. Long articles may need subheadings within some sections to clarify their content, especially the Results and Discussion sections. Other types of articles such as case reports, reviews, and editorials are likely to need other formats. Authors should consult individual journals for further guidance.

Introduction

State the purpose of the article. Summarize the rational for the study or observation. Give only

strictly pertinent references and do not review the subject extensively. Do not include data or conclusions from the work being reported.

Methods

Describe your selection of the observational or experimental subjects (patients or laboratory animals, including controls) clearly. Identify the methods, apparatus (manufacturer's name and address in parentheses), and procedures in sufficient detail to allow other workers to reproduce the results. Give references to established methods, including statistical methods (see below); provide references and brief descriptions for methods that have been published but are not well known; describe new or substantially modified methods, give reasons for using them, and evaluate their limitations. Identify precisely all drugs and chemicals used, including generic name(s) dose(s), and route(s) of administration.

Ethics

When reporting experiments on human subjects indicate whether the procedures followed were inaccordance with the ethical standards of the responsible committee on human experimentation (institutional or regional) or with the Helsinki Declaration of 1975, as revised in 1983. Do not use patient's names, initials, or hospital numbers, especially in any illustrative material. When reporting experiments or animals indicate whether the institution's or the National Research Council's guide for, or any national law on, the care and use of laboratory animals was followed.

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Describe statistical methods with enough detail to enable a knowledgeable reader with access to the original data to verify the reported results. When possible, quantify findings and presents them with appropriate indicators of measurement error or uncertainty (such as confidence intervals). Avoid sole reliance on statistical hypothesis testing, such as the use of P values, which fails to convey important quantitative information. Discuss eligibility of experimental Subjects. Give details about randomization. Describe the methods for and success of any blinding of observations. Report treatment complications. Give numbers of observation. Report losses to observation (such as dropouts from a clinical trial). References for study design and statistical methods should be to standard works (with pages stated) when possible rather than to papers in which the designs or methods were originally reported. Specify any general use computer programs used.

Put general descriptions of methods in the Methods section. When data are summarized in the Results section specify the statistical methods used to analyze them. Restrict tables and figures to those needed to explain the argument of the paper and to assess its support. Use graphs as an alternative to tables with many entries; do not duplicate data in graphs and tables, Avoid nontechnical uses of technical terms in statistics, such as "random" (which implies a randomizing device), "normal," "significant," "correlations," and "sample." Define statistical terms, abbreviations and most symbols.

Results

Present you results in logical sequence in the text, tables, and illustrations. Do not repeat in the text all the data in the tables or illustrations; emphasize or summarize only important observation

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Emphasize the new and important aspects of the study and the conclusions that follow from them. Do not repeat in detail data or other material given in the Introduction or the Results section. Include in the Discussion section the implications of the findings and their limitations, including implications for future research. Relate the observations to other relevant studies. Link the conclusions with the goals of the study but avoid unqualified statements and conclusions not completely supported by your data. Avoid claiming priority and alluding to work that has not been completed. State new hypotheses when warranted, but clearly label them as such. Recommendations, when appropriate, may be included.

Acknowledgments

At an appropriate place in the article (title-page footnote or appendix to the text; see the journal's requirement) one or more statements should specify (a) contributions that need

acknowledging but do not justify authorship, such as general support by a departmental chairman; (b) acknowledgments of technical help; (c) acknowledgements of financial and material support, specifying the nature of the support; (d) financial relationships that may pose a conflict of interest.

Persons who have contributed intellectually to the paper but whose contributions do not justify authorship may be named and their function or contribution described -- for example, "scientific adviser," "critical review of study proposal", "data collections," or "participation in clinical trial." Such persons must have given their permission to be named. Authors are responsible for obtaining written permission from persons acknowledged by name, because readers may infer their endorsement of the data and conclusions.

Technical help should be acknowledged in a paragraph separate from those acknowledging other contributions.

References

Number references consecutively in the order in which they are first mentioned in the text. Identify references in text, tables and legends by Arabic numerals in parentheses. References cited only in tables or in legends to figures should be numbered in accordance with a sequence established by the first identification in the text of the particular table or illustration.

Use the style of the examples below, which are based with slight modifications on the formats used by the U.S National Library of Medicine in *Index Medicus*. The titles of journals should be abbreviated according to the style used in *Index Medicus*. Consult *List of Journals Indexed in Index Medicus*, published annually as a separate publication by the library and as a list in the January issue of *Index Medicus*.

Try to avoid using abstracts as references, "unpublished observations" and "personal communications" may not used as references, although references to written, not oral, communications may be inserted (in parentheses) in the text. Include among the references papers accepted but not yet published; designate the journal and add "In press". Information from manuscripts submitted but not yet accepted should be cited in the text as "unpublished observation" (in parentheses)

The references must be verified by the author(s) against the original documents.

Examples of correct forms of references are given below.

Articles in Journal

1. *Standard journal article* (List all authors, but if the number exceeds six give six followed by et al.)

You CH. lee KY, Chey RY, Menguy R. Electrogastrographic study of patients with unexplained nausea, bloating and vomiting, Gastroenterology 1980 Aug; 79(2)311-4.

As an option, if a journal carries continuous pagination through out a volume, the month and issue number may be omitted. You CH, Lee KY, Chey RY , Menguy R. Electrogastrographic study of patients with unexplained nausea, bloating and vomiting. Gastroenterology 1980;79:311-4

Goate AM, Haynes AR, Owen MJ, Farrall M, James LA, Lai LY, et al. Predisposing locus for Alzheimer's disease on chromosome 21, Lancet 1989;1: 352-5.

2. *Organization as author*

The royal Marsdon Hospital Bone Marrow Transplantation Team. Failure of syngeneic bone marrow graft without preconditioning in post-hepatitis marrow aplasia. Lancet 1977;2: 724-4

3. *No author given*

coffee drinking and cancer of the pancreas [editorial] BMJ 1981:283:628.

4. *Article in a foreign language*

Massone L, Borghi S, Pestarino A, Piccini R, Gambini C. Localisations palmaires purpuriques de la dematite herpetiforme. Ann Dermatite venereol 1987;114:1545-7

5. *Volume with supplement*

Magni F, Rossoni G, Berti F. BN-52021 protects guinea-pig from heart anaphylaxis. Pharmacol Res Commun 1988;20 Suppi 5:75-8

6. *Issue with supplement*

Gardos G, Cole JO, Haskell D, Marby D, Paine SS. Moore PP. The natural history of tardive dyskinesia. J Clin Psychopharmacol 1988;8(4 Suppl): 31S 37S.

7. *Volume with part*

Hanly C. Metaphysics and innateness: a psychoanalytic perspective. Int Psy choanal 1988;69(Pt3):389-99

8. *Issue with part*

Edwards L. Meyskens F. Levine N. Effect of oral isotretionion on dysplastic nevi. J Am Acad Dermatol 1989; 20 (2 pt l): 257-60.

9. *Issue with no volume*
Baumeister AA. Origins and control of stereotyped movements. Monogr Am Assoc Ment Defic 1978;(3):353-84.

10. *No issue or volume*
Danock K. Skiing in and through the history of medicine. Nord Medicinhist Arsb 1982:86-100.

11. *Pagination in Roman numerals*
Ronne Y. Ansvarsfall. Blodtransfusion till fel patient. Vardfacket 1989;13:XXVI-XXVII.

12. *Type of article indicated as needed*
Spargo PM, Manner JM. DDAVP and open heart surgery [letter]. Anaesthesia 1989;44:363-4.
Fuhman SA, Joiner KA. Binding of the third component of complement C3 by Toxoplasma gondii [abstract]. Clin Res 1987;35: 475A.

13. *Article containing retraction*
Shishido A. Retraction notice: Effect of platinum compounds on murine lymphocyte mitgenesis (retraction of Alsabti EA, Ghalib ON, Salem MH. In: jpn J Med Sci Biol 1979;32:53-65). Jpn J Med Sci Biol 1980;33:235-7.

14. *Article retracted*
Alsabti EA, Ghalib ON, Salem MH. Effect of platinum compounds on murine lyphocyte mitogenesis [Retracted by Shishido A. In: Jpn J Med Sci Biol 1980;33:235-7]. Jpn J Med Sci Biol 1979;32:53-65.

15. *Article containing comment*
Piccoli A, Bossatti A. Early steroid therapy in IgA neuropathy: still an open question [comment]. Nephron 1989;51:289-91. Comment on: Nephron 1988;48:12-7.

16. *Article commented on*
Kobayshi Y, Fujii K, Hiki Y, Tateno S, Kurokawa A, Kamiyama M. Steroid therapy in IgA nephropathy: a retrospective study in heavy proteinuric cases [see comments]. Nephron 1988;48:12-7. Comment in: Nephron 1989;51:289-91.

17 *Article with published arratum*
Schofield A. The CAGE questionnaire and psychological health [published erratum appears in Br J Addict 1989;84:701] Br J Addict 1988;83:761-4

Books and Other Monographs

18. *Personal author(s)*
Colson JH.Armour WJ. Sports injuries and their treatment. 2nd rev. ed. London: S. Paul. 1986.

19. *Editor(s), compiler as author*
Diener HC, Wilkinson Me, editors. Drug induced headache. New York: Springer-Verlag, 1988.

20. *Organization as author and publisher*
Virginia Law Foundation. The medical and legal implications of AIDS Char lottesville: The Foundation, 1987.

21. *Chapters in a book*
Weinstein L, Swartz MN. Pathologic properties of invading microorganisms. In: Sodeman WA Jr, Sodeman WA, editors. Pathologic physiology: mechanisms of disease. Philadelphia: Saunders, 1974:457-72.

22. *Conference proceedings*
Vivian VL, editor. Child abuse and neglect: a medical community response. Proceedings of the First AMA National Conference on Child Abuse and Neglect; 1984 Mar 30-31; Chicago. Chicago: American Medical Association, 1985.

23. *Conference paper*
Harley NH. Comparing radon daughter dosimetric and risk models, In: Gammage RB, Kaye SV, editors. Indoor air and human health. Proceedings of the Seventh Life Sciences Symposium; 1984 Oct 29-31; Knoxville (TN). Chelsea (MI): Lew is, 1985:69-78.

24. *Scientific and technical report*
Akutsu T. Total heart replacement device. Bethesda (MD): National Institutes of Health, National Heart and Lung Institute: 1974 Arp. Report No: HIH-NHLI 69 2185-4.

25. *Dissertation*
Yousef NM. School adjustment of children with congenital heart disease [dissertation]. Pittrsburgh (PA): Univ of Pittsburgh. 1988.

26. *Patent*
Harred JF, Knight AR, McIntyre JS, inventors. Dow Chemical Company, assignee. Epoxidation Process. US patent 3,654,317. 1972 Apr 4.

Other Published Material

27. *Newspaper article*
Rensberger B. Specter B.CFCs may be destroyed by natural process. The Washington Post 1989 Aug 7:Sect. A:2(Col. 5)

28. *Audiovisual*
AIDS epidemic: the physician's role [videorecording]. Cleveland (OH): Academy of Medicine of Cleveland, 1987.

29. *Computer file*
Renal system [computer program]. MS-DOS version. Edwardsville (KS): Medi Sim. 1988.

30. *Legal material*
Toxic Substances Contro ct: Hearing on S. 776 Before the Subcomm on the Environment of the

Senate ... On Commerce, 9th Cong. 1st Sess, 343 ...

31. ...*ap*
Scotland [tropographic map]. Washington: National Geographic Society (US). 1981

32. *Book of the Bible*
Ruth 3:1-18. The Holy Bible. Authorized King James version. New York: Oxford Univ, Press, 1972

33. *Dictionary and similar references*
Ectasia. Dorland's illustrated medical dictionary. 27th ed. philadelphia: Saunders, 1988:527.

34. *Classical material*
The Winter's Tale: act 5, scene I, line 13-16. The complete works of William Shakespeare. London: Rex, 1973.

Unpublished Material

35. *In press*
Lilly White HB, Donald JA. Pulmonary blood flow regulation in an aquatic snake. Science. In press.

Table

Type each table double spaced on a separate sheet. Do not submit tables as Photographs. Number tables consecutively in the order of their first citation in the text an supply a brief title for each. Give each column a short or abbreviated heading. Place explanatory matter in footnotes, not in the heading. Explain in footnotes all nonstandard abbreviations that are used in each table. For footnotes use the following symbols, in this sequence: *, †, ‡, §, ‖, ¶, ** ††, ...

Identify statistical measure of variations such as standard deviation and standard error of the mean.

Do not use internal horizontal and vertical rules.

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The use of too many tables in relation to the length of the text may produce difficulties in the layout of pages, Examine issues of the journal to which you plan to submit your paper to estimate how many tables can be used per 1000 words of text.

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Unit of Measurement

Measurements of length, height, weight, and volume should be reported in metric units (meter, kilogram, or liter) or their decimal multiples.

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Abbreviations and Symbols

Use only standard abbreviations. Avoid abbreviations in the title and abstract. The full term for which an abbreviation stands should precede its first use in the text unless it is a standard unit of measurement.

Submission of Manuscripts

Mail the required number of manuscript copies in a heavy paper envelope, enclosing the manuscript copies and figures in cardboard if necessary, to prevent bending of photographs during mail handling. Place photographs and transparencies in a separate heavy paper envelope.

Manuscripts must be accompanied by a covering letter signed by all coauthors. This must include (a) information on prior or duplicate publication or submission elsewhere of any part of the work as defined earlier in this document; (b) a statement of financial or other relationships that might lead to a conflict of interest; (c) a statement that the manuscript has been read and approved by all authors, that the requirements for authorship as previously stated in this documents have been met, and furthermore, that each coauthor believes that the manuscript represents honest work; and (d) the name, address, and telephone number of the corresponding author, who is responsible for communicating with the other authors about revisions and final approval of the proofs. The letter should give any additional information that may be helpful to the editor, such as the type of article in the particular journal the manuscript represents and whether the authors(s) will be willing to meet the cost of reproducing color illustrations.

The manuscript must be accompanied by copies of any permissions to reproduce published material, to use illustrations or report sensitive personal information of identifiable persons, or to name persons for their contributions.

Participating Journals

Journals that have notified the International Committee of Medical Journal Editors of their willingness to consider for publication manuscripts prepared in accordance with earlier version of the committee's uniform requirements identify themselves as such in their information for authors. A full list is available on request from the *New England Journal of Medicine* or the *British Medical Journal*. Citations of this documents should be to one of the sources listed below.

International Committee of Medical Journal Editors. Uniform requirements for manuscripts submitted to biomedical journals. N Engl J Med 1991; 324: 424-8.

International Committee of Medical Journal Editors. Uniform requirements for manuscripts submitted to biomedical journals. BMJ 1991 Feb 9;302(6772).

TEACHING HEALTH ECONOMICS TO MEDICAL PERSONNEL FROM DEVELOPING NATION

JOHN LLOYD

South Bank University, London, U. K.

This article seeks to outline some of the major lessons learnt, as a result of the tutor's experience over many years. At a time when the role of economics, especially in the financial field, is playing an increasing role in the management training of doctors and others, attempts are made to point the way to more effective and realistic learning in the area.

The content (and the literature) programmes tend almost universally to cover the twin paths, of the macro environment, development and health and the micro analysis of health care and decision making. However, significant differences of emphasis and approach exist within this overall framework. One extreme and limited option, which draws heavily on the North American model, relies extensively on the structure-conduct and performance model, to demonstrate different outcomes fro health care practice and policies under various assumptions of competitive and monopolistic provision.

Clearly this sophisticated model building approach which focuses upon the hospital and physician as the major agents, has value in terms of academic model building in the context of a wealthy, private enterprise society. It is interesting to appreciate how such models can predict, and hence reinforce, certain common sense results likely to arise in differing situations. The results of organisations operating with non-for-profit objectives leading to quantity maximisation, or the physician control model reveal some sophistication in analysis, but do not translate too easily to other nations and cultures. It can also be argued that in societies where the information base is much weaker, it is of little value.

An alternative direction is a more "introductory" approach, emphasising the wealth of knowledge behind economic concepts relating to health and health care, the usefulness of economic analysis and especially the economic evaluation of health care programmes. Clearly for students of economics, there is much of relevance but for managers and planners in developing countries, charged with dealing with the practicalities of difficult situation, often with little information or organisational support, perhaps a more broad based and less theoretical perspective is likely to be of greater use. Such an approach is taken by a more focuses view, which takes planning in its widest sense - as the major theme, and seeks to utilise an economic approach to issues of management and planning. Given the general usefulness of the planning concept, to "managers" at all levels of the health care system, from national planners to those with responsibility for directing hospitals and rural clinics, an approach which relates and uses 'economics' in such situations. can provide a very useful framework for so many decisions.

The planning scenario also allows for a direct link to macro and micro issues the (planning of) macro development process, and the (planning of) health care decisions. It also permits a very practical use of economics a range of situations, demonstrating its relevance and limitations, allowing for a basic economic approach to decision making, without concentrating over much on sophisticated techniques such as cost-benefit analysis and quality adjusted life years. The methodology underlining such 'techniques' of course, is a valuable addition to the "health managers" armoury but decreasing returns can quickly occur with a highly technical level of knowledge, unless required by a limited number of 'expert' users.

My own experience has led me to a policy of using a planning approach, using economic concepts and ideas in practical situations and always seeking to contrast an economist's approach with the other important influences on decisions faced by operators in the field. The lonely manager is always faced by other powerful influences, political and emotional at all levels of an organisation, bu can be well served by a generalist approach seeking always to weigh up as best s/he can, the relevant costs and benefits. Such an approach, on a community level, so often flies in the face of the more 'individualistic' approach of clinicians, to best serve 'the patient' before them and seeking scientific and objective diagnosis. It is also in contrast with the realities of much decision making based upon rank and power, in which individual clinicians have a voice, which normally carries considerable weight.

Participants' reactions both to such content and methodology, as well as to the style of presentation, tent to follow a predictable fashion. Initially there is much concern and disappointment that this approach so often provides a general way of thinking without producing magical, unique or 'correct' answers. The questions of 'efficiency' and 'equity' with definitional difficulties and in the end involving certain value judgements are normally met with scepticism. Health managers, like business professionals are often seeking 'simple' model answers to what are often very complicated consultancy exercises. The value may lie in the robustness of the approach and its application in the future, to a wide range of problems. An approach which rightly decision, is even more necessary in societies where the necessary information on costs, Preferences, outcomes, is still limited.

In similar vein, participants especially doctors, can sometimes react angrily to any approach which can seem to limit their rights of clinical freedom. Problems can be seen very much in clinical terms, through the 'provider's eyes, and notions of efficiency inn terms of maximum community benefit can take some considerable time to establish. The very poverty and despair of many situations can make such exercises seem rather pointless and time consuming, when, of course, such scarcity should make any sources of inefficiency - operational or allocative - even more unacceptable. The very strong medical lobby and the heavy establishment bias of senior medical Personnel can also mean that any critical analysis of current medical orthodoxy meets resistance. Additionally, and close related to this, is a feeling that little changes is possible anyway.

Decisions relating to resource allocations or investigations to compare activity levels with resources across and with in hospitals may provoke interest, but be dismissed as of little relevance in situations where decisions to change are always 'political'. This may well be true at the hospital level, where the Medical Superintendent or Director has medical qualification and much control over so many decisions. Information and techniques are important managerial tools, but 'economic' can only play an important role where the range of other 'managerial' skills of negotiation, leadership, communications and political 'sense' can also be brought into play. Any tutor failing to stress such a theme, is guilty of failing to understand the organisational realities of decision making.

Clearly the teaching style adopted will be partly directed by the specific situation of the programme. In general though and particularly to be able to confront the reactions already described, an open learning, participative style is recommended. With many group containing members from different countries, and professional groups, particular efforts need to be made to encourage open and frank debate. Some members may initially be unwilling to challenge the views of more senior doctors, or to take a critical view of their own health systems in international debate. Cultural factors can mean that women participants may not wish to take on a leadership role, unless a supportive and non-threatening attitude is established within the group at a very early stage. Perhaps accustomed to a more formal, lecturer-student relationship, many participants may no challenge the so called "expert" role of the tutor, and will be more comfortable with the lecture, model answers format. In particular, the assumed superiority of the surgeons and physicians, in relation to the 'administrative' role of the public health professors also needs to be tackled early on. Modern technology and reproduction facilities can at least make endless note taking less than vital.

It is noticeable that concepts such as equity and fairness are of the paraded as virtues of individual country's systems, but seem to be ill thought out in analytical or measurement terms,

when debated. The pattern of 'free' clinics, under resourced and under-utilised, a model repeated in numerous situations, is often only reluctantly seen to be inefficient and also inequitable and unfair. Through the use of case studies, business exercises and the individual knowledge and experience of the participants, a challenging and relevant set of scenarios can be established. Often it is possible to draw out wonderful examples of 'good practice' being followed in such difficult situations, where high level of operational efficiency and customer satisfaction is being achieved as a result of individual thought and planning by those with no formal management or economic training. The personal commitment and extraordinary hard work delivers a successful health programme even under the most difficult of circumstances. Such success stories can also provide a very welcome antidote, to the more circumspect line of economic enquiry.

By adopting a participative, problem posing approach an involving the discipline of economics in tandem with other skills and disciplines, it is possible to have a multi-disciplinary approach which can relate to organisational an cultural issues. The relevance and vital importance of the information gathering and use even in a quick and ready fashion can strip away many of the preconceived ideas and superficial judgements. The very process of working through evaluative cases is so often more valuable than the final out come achieved. The question of value judgements must not be underestimated, but its role made more explicit in decision making process. Finally, be left frustrated by their inability to employ newly learned lessons and techniques, when they return to their places of work.

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DOTS: WORLD HEALTH ORGANIZATION RECOMMENDED TUBERCULOSIS CONTROL STRATEGY

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Background

Tuberculosis is an ever increasing disease in developing countries[1], and was declared a global emergency by WHO in April 1993. Despite the availability of effective drug regimens, the treatment completion rate varies widely and is generally poor in most of the developing countries. The poor compliance (usually defined as the extent to which patients behaviour coincides with medical advice) is a major problem, leading to multi-drug resistance, chronic disease and continued transmission[2].

Faced with the problem of poor compliance and multi drug resistance, many developing countries (including Pakistan) have already endorsed the WHO's recommended directly observed treatment short course (Dots) as the strategy for tuberculosis control in their respective countries.

Dots - WHO's proven and cost effective TB control strategy[3] - is a form of supervised care for Tb. control. It works by ensuring that a continuous supply of treatment is available to the patient, together with encouragement and information necessary to assist him/her take that treatment until (s)he is cured.

Assumption underlying DOT approach is: that human nature is unreliable, and supervision is an effective way or reinforcement of appropriate behaviour.

The arguments presented in favour of DOTs includes:

(a) unsupervised short course chemotherapy (SCC) has not led to the required cure rates despite considerable efforts, and b) DOTs provides and opportunity to enhance the role of district health services and the communities in tuberculosis control.

The arguments presented against DOTs includes:

(b) additional (unjustifiable) expense to health services, b) potential for driving tb. patients into the private sector, and c) inversion of a basic human right by treating tuberculosis patients as guilty until proven innocent.

Possible ways of offering DOTs[4]:

i) **Health facility based:** This is more feasible where: a) population is dense, b) health services infrastructure is well developed, and c) access to health services is easy.

ii) **Health Worker based:** The approach needs a) availability of adequate numbers of health workers with certain desirable characteristics, b) adequate supervision/motivation/support systems.

iii) **Community based:** The approach relies on availability of community volunteers who are: a) able and willing to provide assistance to people with tuberculosis, and b) are known both to the health facility staff and the patients. These may include former TB patients, teachers, local NGOs, traditional healers, religious person etc.

iv) **Family based:** A family member is selected as a treatment supervisor. Formalizing the relationship between the patient, family supervisor and health facility may go some way towards encouraging completion of treatment. This form of DOT will be particularly important where health services are poorly developed, and stigma is common. It may be particularly appropriate for children with Tb.

None of these four strategies are mutually exclusive. A health facility may offer all four types, with one predominating according to local circumstances. The patient and the Incharge health facility should jointly make the decision on strategy to adopt for a particular patient.

DOTs Experiences in other countries:

Although, directly observed treatment has shown encouraging results in some parts of the world including South Africa[5], Tanzania, New York and China[6] etc. Yet surprisingly few countries are implementing WHO's proven and cost effective Tb. control strategy[7].

South Africa: Eighty nine percent of surviving patients completed six months fully supervised twice weekly treatment through the use of unpaid non health workers as community based supervisors[8].

Tanzania: One of the first to demonstrate that Tb can be controlled in poor countries through the use DOTs. In pilot projects cure rates increased from 43 percent to nearly 80 percent[9].

New York: More than forty percent of Tb. patients now receive directly observed treatment in New York. The number of cases lost to follow up decreased by more than twelve fold (from 1991 to 1993).

China: Pilot project in five countries, near Beijing, achieved astonishing cure rate of 94 percent. Although the program has expanded to almost half of the country, but cure rate remains very high i.e. more than 90 percent.

However: experiences in these few countries can't be generalized, without further assessment, to other developing countries, due to the wide difference in context.

DOT's in Pakistan:

Pakistan is among 30 percent of countries in the world, where tuberculosis control policies recommended by WHO and the IUATLD (International Union Against Tuberculosis and Lung Disease) have been adopted.

In recently developed national guidelines (March 1995), the directly observed treatment short course (DOTs) has been adopted as a strategy for tuberculosis control in Pakistan[10].

The Directorate Tuberculosis Control Pakistan in collaboration with provincial health authorities has already launched DOT Pilots in selected districts of Pakistan. The Directorate in collaboration with Association for Social Development, an NGO, is also involved in an operation research/development project to assess the effectiveness and the feasibility of directly observed treatment, and to develop procedures and materials for effective implementation of DOTs.

Despite these on-going efforts of making Tb. Control more effective, there is a definite need for: a) further strengthening of NTP infrastructure, b) developing procedures and materials for effective implementation of DOTs, c) establishing ways and means to effectively co-ordinate the Tb, control activities at various levels, and d) strengthening the capabilities of the government health facilities and the private medical practitioners.

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NATURAL FAMILY PLANNING

A LITERATURE REVIEW

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Summary

Natural Family Planning (NFP) is a refinement of Non-Supply methods known to mankind for centuries. NFP relies on the knowledge of reproductive physiology and its use to control fertility. In a country like Pakistan where religious beliefs and social taboos, coupled with logistics problems relating to contraceptives, result in low contraceptive Prevalence Rate (12%), NFP can be promoted as an alternate and adjunct method of Family Planning. NFP is not only cost-effective in the long run, but its effectiveness is not less than the traditional methods of Family Planning. A thorough review of contemporary literature on the topic of NFP was done and relevant and useful abstracts reproduced in a brief article.

There is wide disparity between women's knowledge and use of contraceptives in Pakistan. While 78% of currently married women report knowing at least one method of contraception, only 21% have ever used a method, only 12% are currently doing so. (1)

Some factors responsible for low contraceptive prevalance rate quoted in a study are:

1. Inadequate and interrupted supply of contraceptives not meeting the demand.
2. Religious beliefs, discouraging contraceptives use.
3. Fear of side effects of modern contraceptives.(2)

Natural Family Planning (NFP) is a term used to describe methods of planning or preventing pregnancy based on observation of naturally occuring signs & symptoms of fertile and infertile phases of the menstrual cycle. People who use NFP to avoid or delay pregnancy abstain from intercourse on potentially fertile days. It is important to note that NFP is not a method of contraception but rather a technique for determining the fertile period : ABSTINENCE DURING THIS PERIOD IS WHAT PREVENTS PREGNANCY.

A chart produced by the United Nations Secretariate on world contraceptive use in 1987 shows that, on average, 25% of couples in the reproductive age group in developed countries rely on "non supply" methods, i.e. rhythm and withdrawl, for contraception. In more detail the statistics for the United Kingdom show that although only 7% of women use the Intra Utrine Contraceptive device(IUD), "NON SUPPLY" methods are used by 8% (3).

The desire of many modern women to liberate their bodies from the dictates of drugs and doctors had led some to take a close look at the natural method of family planning. In the past, ignorance and distrust made members of the medical profession, and consequently their clients, reject natural methods, but this situation is now changing, largely as a result of public demand and modern scientific discoveries about how the reproductive system works.

Today, natural methods are being increasingly and successfully used by couples in western cultures, not as in preceeding decades for moral or religious reasons, but for reasons of ecology and health.

Nature has provided women with a highly effective, built-in system of fertility regulation. The goal for users of natural family planning is to utilize this natural birth control system and so eliminate the need for artificial inputs to the body. Surprisingly few women realize that they are able

conceive for only a few days each month and that it is possible, with increasing accuracy to guage the timing and duration of the fertile period. Hence, NFP offers a RISK-FREE, RELIABLE AND, MOST IMPORTANT OF ALL, A POSITIVE APPROACH TO FAMILY PLANNING. These methods are devised to work with, rather than against, the natural cycles of a women's body

Advantages of NFP
Methods include the Following :

NFP can be used either to avoid or to achieve Pregnancy.

There are no physical side effects.

The correct use of NFP methods increases self-awareness and knowledge of human reproductive functions.

Users develop self reliance.

NFP use can promote involvement of the man, and cooperation, communication and shared responsibility of the couple for family planning.

NFP services can be provided as a seperate service or as part of an established health and family planning or community agency programme.

Delivery of NFP services is not dependent on medically qualified personnel.

Disadvantages of NFP
Methods Include the Following :

When NFP is used to avoid pregnancy, some couple experience emotional stress as a result of the need to abstain from intercourse for between 8 and 16 days, depending on the method they use. Tension may also be caused by uncertainity about the effectiveness of the methods.

At present the four natural methods used for family planning are:

1. Calender (Rhythm) Method

It is a method for preventing pregnancy by identifying the fertile days of a woman cycle. The woman calculates the begining of her fertile period based on the knowledge that:

Ovulation occurs 14 days before the onset of her next menses.

The ovum is viable for 24 hours.

Sperms remain fertile from 48-72 hours.

The fertile or unsafe period is taken to be between 11 and 18 days before the next menstrual period. To estimate this the first unsafe day is obtained by deducting 18 from the number of days in the shortest of the last 12 cycles and the last unsafe day by deducting 11 from the number of days in the longest cycle of the last 12 cycles. For example, if the shortest cycle is 25 days and the longest 31 days, the calculation is (25-18) and (31-11) the fertile phase would be considered to last from about day 7 until day 20. During her fertile (unsafe) days she would have to abstain from intercourse to avoid pregnancy. Safe period is days 1-6 of start of the cycle and from 21 to 27 days of the cycle.

This method is effective only in women with regular periods.

2. Basal Body Temperature (BBT)

A woman using this method must take her body temperature every morning for 3.5 minute before getting out of bed and eating any food. She has to be taught how to read the thermometer and record the daily reading. She will notice an increase in temperature (0.2 - 0.5 C) begining soon after ovulation. The temperature may drop slightly about 12-24 hrs before ovulation. The BBT remains elevated until the next menstrual period. The women must take accurate measurements with a special thermometer to detect this slight increase and record temperature on an appropriate chart.

When the BBT method alone in used, the couple should abstain from day one until three days after the temperature increases. Alternatively, another backup method can be used during this time.

3. Cervical Mucous Method

A woman using this method observes and records every day the changes in her cervical mucous. Typically, a woman may observe no mucous for 2-3 days after her menstrual bleeding ends. Then when cervical mucous appears, it is sticky and pasty, and is from yellow to white in colour. As ovulation approaches, the mucous increases in quantity, becomes clear in colour and wetter so that it can be stretched between two fingers. After ovulation, the mucous again

becomes sticky and pasty and decreases in quantity. In or to avoid pregnancy, the couple must abstain on all days when the woman notices the presence of mucous until the fourth day after the peak sympton day (the day of wettest mucous).

4. Sympto Thermal Method

Sometimes the BBT and the cervical mucous method are combined; this is known as Symptothermal method.

The more recently developed methods identify the fertile period from either the basal body temperature or the characteristic of the cervical mucous or both. These primary signs may be complemented by other signs detected by the women as recurring in her own pattern of fertility, for example, breast sensitivity, abdominal pain, intermenstrual bleeding and changes in the position, opening and texture of cervix.

The use of a natural family planning method requires a period of abstinence from intercourse at the time the woman is fertile. The length of abstinence varies depending on the length of woman's cycle, the signs and symptoms in the cycle, and the method used. Some couples, if they have chosen NFP methods for reasons other than religious ones, may choose to combine fertility observations with effective barrier methods during the fertile time, rather than abstaining from sexual intercourse. However, as this is the fertile time, one limitation against this course of action is that there is an increased risk of pregnancy should the barrier method fail. Also, the use of spermicides interferes with mucous observation.

It will not be out of place to mention briefly about NON-SUPPLY METHODS OF FAMILY PLANNING i.e.

(1) Coitus interruptus or withdrawl.

(2) Breast feeding.

Withdrawl is a crude and ancient method of natural family planning. This particular method (the only contraceptive method known) was practiced by companions of Prophet, and he knew and did not forbid it (Jabir). The practice should have the mutual consent of the couple-According to the Prophet's ruling" a man must not practice withdrawl with his wife without her consent" (Abu Dawood). (2)

Breast Feeding is nature's way of spacing children by delaying the return of menstruation and fertility. In many developing countries where family planning services are not widely available, breast feeding is often the only way to space births. Exclusive breast feeding is more reliable as a method of child spacing during the first 6 months post partum.

The three breast feeding practices that appear to have the greatest influence or lactational infertility are the following.

-- The degree of exclusivity of breast feeding or the supply of breast milk unsupplemented with other foods or liquids.

-- The duration of breast feeding or the number of weeks or months the mother breast feeds her baby.

-- The frequency or the number of times the mother breast feeds her baby in a 24 hour period. (7)

Effectiveness of NFP

The effectiveness of many reversible methods of family planning depends both on how the users understand the mothods and on how well they use that knowledge. Most family planning methods have a theoretical failure rate of 5% or less. Natural family planning methods also have a theoretical failure rate of between 1% and 5% depending on the methods used (4).

Cost Effectiveness

The NFP users must be taught to use the method and this can be expensive. Often, one teacher teaches one user or couple, at a time. Training can take 3-4 months (or cycles) and instructional materials (charts, booklets, user record charts, etc) are required.

However, some aspects of NFP may offset cost of training. NFP instructors need not be medically trained. Often, successful NFP users offer (or can be recruited) to become NFP teachers and to teach as unpaid volunteers. Once the methods have been learnt, the cost of continued use is low since the user only needs a pencil, a paper chart and a thermometer, for recording basal body Temperature.

...z Delivery

The first concern in NFP service is always whether the natural methods will be accepted by potential family planning users. In some cultures, the social attitudes of the people may make NFP acceptable; Indeed religious and ethical beliefs may mean that NFP is the only option some people will consider using.

The literacy level of the users will affect the way in which any family planning method is taught; in general, the more literate a population, the less difficult it is to teach a method. Perhaps more than any other method, NFP is based on education. However, this does not mean that a user must be able to read. Illustrated instructional and user meterials have been developed for NFP and used.

The New Technologies

The two main problems for couples using NFP are the daily chore of observation and charting and the subjective assessment of her fertility by the woman. There have recently been rapid developments in technologies to detect the fertile phase in the cycle.

Technology can fail or err, and in such circumstances, it is the basic knowledge of fertility and sexuality which can come to the rescue. However some noteworthy inventions are:

(i) *Urinary dispticks/pads and colour changes:*

The leutiinizing Hormonal (LH) Dipstick one step (LH) dipstick which can be carried out in a matter of seconds and gives a result in a few minutes. The dipstick is held in the stream of the first urine in the morning and the results are immediately available.

Depending of the cycle length, the test is carried out for 5 days (normal and short cycles) OR 10 days (Long cycles) This test is particularly useful for women or couples who wish to detect high fertility in the cycle in order to conceive.

(ii) Test kits for oestradiol and pregnandiol in urine.

Test kits for the urinary detection of the metabolites of oestrogen and progesterone are also available.

A single drop of undiluted urine is placed on the matrix and then add an enzyme congugate and a substrate solution.

The final result will be:

(a) No colour change (indicating high pregnandiol level).

(b) Dark blue spots which is equal to or darker than the reference colour (indicating low pregnandiol level). The test only takes 5 minutes to perform and the results are immediately available, test to be performed on 3 consecutive days during the mid luteal phase of the cycle.

(iii) *Measurement of changes in body fluids:*

There are changes in the amount of vaginal fluid (transudate) during the cycle under the influences of oestrogen and progesteron. Vaginal transudate is increased in the high oestrogen phase and decreased in the progesterone phase in a similar manner to mucus volumes. The development of a small plastic, graduated, disposables vaginal aspirater, the Rovumeter, makes it possible to aspirate the combined mucus and vaginal fluid (cervico-vaginal fluid-CVF) and accurately measures the amount aspirated. There is a tenfold increase in cervico-vaginal fluid volume in the fertile days of the cycle. The aspiration has only to be done 10 days of the cycle to detect changes.

(iv) *Measurement of changes in electrical resistance*:

The electrical resistance of the vagina saliva and skin change during the menstrual cycle. Due to the changing levels of sex hormones changes in electrical resistance can be measured. This method is still under trial.

(v) *Digital and electronic thermometers*

For those women who use BBT method for NFP, digital thermometers have the advantage of reducing the recording time from five minutes to 45 seconds. The digital read-out facilitates easy and reliable reading. Micropressor calculates the rate of change of temperature and gives an audible beep when the temperature reaches equilibrium.

Two electronic thermometers are also available.

1. The Rite-time rhythm clock combines an electronic thermometer and a battery operated calculator, a temperature probe is used to measure the BBT and the reading is displayed on a small screen.

The daily BBT measurements are stored in the computer.

2. The second electronic thermometer is the Bioself 110 Fertility Indicator.

This thermometer works in a similar manner to the Rite-time except that no temperature reading is displayed. The device uses a combination of the calender and temperature methods to detect the fertile and infertile phases of the cycle, and indicates by means of signal lights the fertility level for any particular day in the cycle. Green light indicates fertility, a steady red light indicate low fertilty, and a flashing red light denotes high fertility.

(vi) *Computers*

Small battery operated computers are now available into which clinical data can be entered and degrees of fertility obtained. One such is called the OVIA, a home computer. This correlates temperature, mucous patterns and cervical changes to indicate varying degrees of fertility. The results are displayed on a small screen.

Conclusions

The most important point to remember when considering natural family planning is that it is not so much a technique as a way of life. This is ann ideal alternative for a country like Pakistan, if we consider the objections of religious circles to family planning and take into account the long term cost and logistics problems.

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PRIVATE MEDICAL PRACTITIONERS AND TUBERCULOSES CONTROL

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Introduction

It has been widely recognized and acknowledged by public health professionals that effective control of Tuberculosis (Tb) is only possible if diagnostic processes and treatment regimens/procedures are standardized and are uniformly applied by all health care professionals. In Pakistan, anecdotal data and small scale research studies have highlighted the fact that there is significant range of varying processes and treatment regimens in place, especially among Private Medical Practitioners (PMPs). The general opinion of Tb. care professionals in Pakistan is that this is due to different levels of professional capabilities, support facilities and attitudes of the health care professionals.

At the level of the Government Health Facilities (GHFs), significant efforts are underway by the National Tuberculosis Programme (NTP) to enhance institutional capacities and professional capabilities of the public sector Tb. control services. However, there is no program at present to integrate the private medical professionals in Tb. control, though their is a realization that effective TB. control programs will only be possible with the integration of the PMPs. The NTP managers and representatives of the private medical professionals have time and again expressed the need and willingness to work together and that there are a number of areas where this mutual support can be effectively built.

This paper addresses the issue from the perspective of its importance and then explains opportunities and threats for collaborative work between PMPs and GHFs for control of Tb.

Tuberculosis : A Major Public Health Problem

Tuberculosis is the largest cause of death from a single infectious agent in the world killing nearly three million people every year[1]. The disease accounted for 3.4% of all disability adjusted life years lost globally in the year 1990[2] and the increasing linkage of Tb. with HIV positive cases underlines the need for immediate action for control of the disease. The projected rapid rise in HIV prevalence in Asia, adds to the urgery of Tb. control in the region[3].

As per WHO estimates, more than 0.3 million of new cases of tuberculosis develop in Pakistan every year, three quarters of which are concentrated in the productive age group leading to disproportionate effect on economic and social life[4]. The NTP program is based on the understanding that effective case management (i.e. diagnosis, treatment and follow up) is the only measure likely to have a significant effect on Tb. control for the foreseeable future[5].

Tuberculosis Control Situation

Traditionally, resources for Tb. control have been channelled and programs have been implemented mainly or wholly through the public sector. These programs have had limited success, due to a number of factors, in many developing countries, especially in those where a high proportion of qualified doctors work in the Private sector[6]. Preliminary findings of a qualitative study conducted recently in Pakistan pointed out that about two thirds of the patients interviewed had attended a private medical practitioner before approaching government health facility. Furthermore, that patients had received treatment for a number of ailments (ranging from simple cough to pneumonia) before being diagnosed as tuberculosis patients[7]. A wide range of variation in Tb. case management practices has been identified among private medical practitioners in India[8]. Once diagnosed many patients shop back-and-forth of treatment between the private and public sectors resulting in frequent changes in treatment[9].

The Policy Direction

All the above clearly demonstrates the need to implement measures to ensure effective case management in both the public and private sectors, and effective coordination between them. Standardisation and coordination of diagnostic practices, treatment regimens, health education practices and coordination between the private medical practitioners and the govt. health facilities is the only probable strategy to achieve the objectives of 70% case detection and cure of 85% of newly diagnosed cases[10].

Private Medical Practitioner's Role

The high proportion of patients who preferentially use fee-charging private practitioners, rather than free public services, testify to the importance of this services to the services to the consumers and potential significance of the sector for achieving national Tb. control objectives. Interventions to optimize Tb. control in countries where high proportion of cases attend Private practitioners, need to be based on understanding the capability, the practices and the factors influencing the quality of care in both the private and the public sectors.

The understanding should base on the following questions;

(a) What are the current professional capabilities, capacities of the practice infrastructure, attitudes and practices of PMPs in the diagnosis and management of Tb cases?
(b) What is the professional capability, institutional capacity and practice in management of Tb cases?
(c) What are opportunities and constraints in enhancing the capacities of PMPs to manage Tb cases?
(d) What are the possible strategies for linkages and mutual support between PMPs and GHF?
(e) What is the feasibility, effectiveness and replicability of the agreed strategies for PMP/GHF partnership in the Tb control.

It is recognized that there are variety of potential mechanisms for enhancing the Tb. care capabilities and case management practices; that these need to be employed at different levels of health care services both public and private; that there are a range of actors who can influence the development and functioning of quality optimization mechanisms. The systems theory can be applied to explain that how these factors might be combined to develop and effectively implement mechanism and strategies for effective Tb. control in Pakistan.

Systems Approach and the PMPs, GHFs Linkages[11]

Application of general systems theory and particularly open system organizational theory offers a useful tool for furthering the process of improving connections among health organizations. An important aspect is consideration of the ways to integrate inter-organizational networks. Such an effort involves an attempt to construct an abstract model characterizing a desired pattern of inter-dependency coordination of existing and to-be-developed health and health related organizations.

A system is a whole of components which inter-act to produce some effect. Open system theory provides an explanation of not only the internal environment of health organization but also how it relates to other organizations and other elements in the environment. Each organization has its boundary constituted by a differentiation of technology, territory, or time or some combination of these. The permeability of the organizational boundary depends upon, what is brought in and sent out in terms of inputs and outputs and the variation in the nature of internal and external resources. The particular nature of the boundaries determine how dependent or independent the organization is to outside influence and physical and social isolations from surrounding systems and adequacy of communication channels.

The linkages between GHFs and PMPs can be explained on the basis of systems theory. A inter-system model could be the best approach. According to this approach both GHFs and PMPs are systems, both systems have their boundaries constituted by a differentiation of technology, the boundaries are selectively permeable to resources, services and information. Both the systems are inter-dependent and in competition regarding the resources (inputs) and services (outputs). There is an overlapping of system domains (characterized by population served, disease coverage and types of services given) between the GHF and PMP systems which further make them inter-dependent

...g their inputs and outputs (and to some ...l processes as well).

In the context of tuberculosis control it is important to know, how far both the systems are inter-dependent and what are the potentials for furthering this interdependence; to which types of resources the boundaries are permeable and how for the "boundary control" can be managed and who could best act as "boundary spanners". How the domain overlap can best be exploited in collaborative activities for T.B. Control.

Forms of Organizational Linkages[12]

Organizational linkages may take different form of interdependency i.e. cooperation or competition.

COOPERATION

Cooperation has been further classified into Bargaining, Cooptation and Coalition.

(i) Bargaining

An organization needs the support of another organization and the negotiations are entered into for the exchange of resources or services between the two organizations. Generally the second organization whose support is needed is in a position to exercise control over the organizational decision process of the first one. An example may be resource sharing by the GHFs with PMPs for T.B. control.

(ii) Cooptation

Goal setting is shared by the coopted organization through determining the occasion for a goal decision and through participating in analyzing the existing situation to suggest alternatives and through taking part in the deliberations of consequences. In the context of health system, overlapping memberships through cooptation can help in the integration of the diverse sub-systems. An example may be cooptation in hospital ward facilities for the Private Medical Practitioners.

(iii) Coalition

Coalition is sharing of common goal. Goal sharing may be short-term or long-term. It is different from a merger in a sense that none of the organization loses its separate boundaries and each member can withdraw from the relationship. This form of inter-dependency requires most extreme form of environmental conditioning. This perhaps can best be applied in goal sharing in TB control by the stakeholders.

Competition

Organizations may become interdependent in their competition for scarce resources. Acquiring of resources by one organization is at the cost of others needed resources. In a health system context the sub-systems may compete for either or both inputs and outputs. These may be in the form of resources or clients. This competition can also be exploited in a positive direction for T.B. control provided there is domain consensus

In simplified terms following collaborative linkages can be hypothesized between the GHFs and PMPs for T.B. control activities[13].

(1) Access of PMPs to diagnostic facilities available at GHFs.
(2) Access to specialist advice including referral of patients to facilities available at GHFs.
(3) Availability of admission facilities for patients requiring hospitalization.
This may take two forms.
Ward beds can be allocated to PMPs for the care of their patients, or PMP referred patients can be taken care of by the GHF staff for hospitalized care and for continuity of care they may be referred back to the referring PMP.
(4) Availability of continuing education facility for PMPs catered at GHFs/
(5) Sharing therapeutic, health education and other materials.

To Conclude, standardisation of practices, coordination and resource sharing between PMPs and GHFs, is required if NTP targets of 85% cure rate of newly diagnosed sputum positive cases and 70% case detection of the estimated incidence by year 2000 are to be achieved. And for the standardization of practices, coordination and resource sharing an **action research** is urgently required which should identify and test strategies for strengthening the role of PMPs to control TB through improved cases management and mutually supportive linkages with GHFs.

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CEREAL-BASED ORAL REHYDRATION THERAPY "MOTHER'S CHOICE": A STUDY IN SQUATTER SETTLEMENTS OF KARACHI, PAKISTAN

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Summary

Diarrhoeal deaths can be prevented by prompt use of oral rehydration therapy. Effective management is dependent on ready availability of ingredients for preparing oral rehydration (OR) solution, which have a low cost and are culturally acceptable. The present study was conducted in 5 squatter settlements of Karachi to determine mother's preferences for cereals in preparing cereal-based oral rehydration solution.

Fifty one to ninety one percent of the respondents living in the different squatter settlements preferred ground rice (home made or rice flour (ready made) for preparing OR solution. There were no differences in the choices of rice or wheat when compared among diverse ethnic groups. In only one setting — among Punjabi speaking people in Azam Basti — did (41%) mothers preferred wheat flour. A majority (90%) of the mothers chose rice because of its softness and cooling effect. Preferred for rice was dependent on its availability ($P < 0.00$) and price ($P < 0.05$). In addition, during diarrhoea, rice is commonly used as a diet in combination with lentils (Khitchri). The results of this study indicate that rice is preferred for preparing OR solution in urban squatter settlements irrespective of ethnicity. However, availability and cost need to be taken into account.

Introduction

Dehydrating diarrhoea is one of the important killer of children specially in the developing countries of the world. Approximately four million children die every year (1,2) accounting for between 25% to 35% the child mortality (3).

Diarrhoeal diseases also remain one of the major health problems of the urban squatter settlements (Katchi abadis). Diarrhoea associated mortality accounted for 34% of all infant deaths in the Katchi abadis of Karachi[4]. The cause of diarrhoea death is due to dehydration and malnutrition. However, both these causes are preventable with early administration of oral rehydration solution (ORS) and feeding during and after recovery from diarrhoea (5).

Although ORS packets have been proved to be powerful weapon for the management of diarrhoea both in the treatment center and at home (6,7) but in practice problems still arise related to knowledge, and correct preparation. According to the control of diarrhoeal diseases report (CDD) (8) ORS use rate in Pakistan is reported to be 17.4%. The lower use rate of ORS may be due to the non-availability of ORS packets in remote areas and/or failure to train mothers to prepare sugar salt solution.

ORS or sugar salt solution when prepared incorrectly may pose the problems of osmotic diarrhoea. Furthermore, the inability of the present ORS to reduce stool volume and the duration of diarrhoea leads to a lack of confidence on the part of mothers (9). In contrast, recently developed cereal based ORS has less osmolality and thus is free from osmotic penalty and also reduce the severity of diarrhoea. The polysaccharide of the cereals serve as the carrier molecules (9). Hence necessary carrier molecules can be provided by a natural, familiar, and staple food. Great emphasis are now being given by WHO - to promote cereal based home fluids because of its scientific merit and cultural acceptance and cost-effectiveness (10). Rice-based

ORS is reported to be superior to glucose/sucrose based ORS (11). Recently several other cereals such as wheat, maize, millet, sorghum and lentils have been reported to be effective in treatment of diarrhoea in many other developing countries of the world (9).

As the staple food varies in different parts of Pakistan, there is a needs to assess and identify the knowledge and cultural acceptance of the cereal to be used for the management of diarrhoea. It is important to reach a consensus of the specific staple food, the majority of the household can afford before developing any training material and imparting knowledge to the mothers of varied ethnicity for the effective use of cereal based ORS at home. In Bangladesh, rice-based ORS was more acceptable in the community and treatment center (6,7) as rice is the staple and blended with the traditional practices of the mothers (7). Unlike Bangladesh, the staple food varies in Pakistan, according to the geographical scope and ethnicity.

Therefore, the present study aimed to receive a response from mothers living in a representative population of the five Katchi abadis of Karachi. Not only the preference for cereals were inquired, but also the reasons for preference in different ethnic groups. The feasibility of using rice or wheat as cereals for home-based oral rehydration therapy was also studied.

Materials and Methods

A cross-sectional survey was conducted in 5 squatter settlements of Karachi. These are presently under the surveillance system of a teaching institution. A Primary Health Care system has been established covering a population of 7.000 to 10.000 in each area. The Survey was completed in 2 months of duration. Using systematic random sampling, 558 households were selected from 5 field sites in order to have a population representative of diverse ethnic groups. Community Health Workers [CHWs] of the respective field sites interviewed mothers who had at least one child under 5 years of age, using a set questionnaire. CHWs were trained in administering the questionnaire by the authors. The questionnaire was translated into Urdu and pretested in the field sites before conducting the survey. Data collected were collated, entered into a computer and checked for consistency and analyzed.

Results

Fifty one to ninety one percent of the respondents living in different squatter settlements preferred both ground rice (home made) or rice flour (ready made) for preparing oral rehydration solution (Table 1). There were no differences in the choices of rice or wheat when compared among diverse ethnic groups. In only one setting - among Punjabi and Urdu speaking people in Azam Basti, 41% and 37% of mothers, respectively, preferred wheat flour (Table 2).

Table 1 *Percentage distribution of choice of cereals in different urban squatter settlements of Karachi.*

Settlements	Rice flour (ready made) %	Wheat flour %	Ground rice (home made) %	Not sure %
Orangi (n=99)	40.4	8.1	37.4	14.1
Grax (n=120)	11.7	1.7	39.2	47.5
Chanesar Goth (n=124)	33.1	4.8	58.1	4.0
Essa Nagri (n=92)	33.7	19.6	29.3	17.4
Azam Basti (n=120)	34.2	36.2	15.8	13.3

A majority of the mothers chose rice because of its softness and cooling effects, as compared to easy availability (52%) and easiness in cooking (44%) for preferring wheat flour for OR solution (Table 3). However, preference for rice was affected by its availability and price (Table 4), When rice was currently available at home, 223 mothers preferred to use rice as compared to 148 only, when rice was not available ($P < 0.00$). Similarly price of rice was an important factor; 34 mothers preferred to use wheat flour when price of rice was more than Rs. 6.00 per kg. ($P < 0.05$). Rice has been traditionally used in different forms for the management of diarrhoea. This during diarrhoea, was commonly used as a diet in combination with lentils - Khitchri (39%) and

along with yogurt (25%) and sometimes only rice and rice with yogurt.

Table 2 *Percentage distribution of choice of cereals for OR solutions, according to major ethnic groups in different squatter settlements of Karachi.*

Ethnic Group/ squatter Settlements	Rice flour (ready made) %	Wheat flour Atta %	Ground rice (home made) %	Not sure %
PUNJABI				
Orangi	45.5	18.2	18.2	18.2
Grax	17.1	0	58.5	24.0
Chanesar Goth	42.1	10.5	42.1	5.3
Essa Nagri	34.O	19.8	29.7	16.5
Azam Basti	30.5	40.7	15.3	13.6
SINDHI				
Grax	62.5	0	12.5	25.0
Chanesar Goth	37.7	3.8	54.7	3.8
Esssa Nagri	0	0	0	0
Azam Basti	50.0	33.3	0	16.7
URDU SPEAKING				
Orangi	38.8	7.1	40.0	14.1
Grax	0	0	62.5	37.5
Chanesar	15.0	5.0	70.0	10.0
Essa Nagri	0	0	0	0
Azam Basti	33.3	36.7	16.7	13.3

Conclusion

Packet made ORS has wrongly been promoted as a drug with a general belief that it will cure the diarrhoea. However, as we know it only replaces the lost fluid and fails to reduce the magnitude of diarrhoea which compels many physicians for indiscriminate use of antibiotics. Besides, logistic problems of procuring glucose or sugar, packaging, storing and etc. all pose a problem on the CDD programme of the poorer countries where diarrhoea is more frequent. This, although the production of ORS packets has gone up, actual availability is limited to less than half the population who need this (12).

Table 2 *Reasons for preference of rice & atta for preparing cereal based oral rehydration solution*

	Rice %	Atta (wheat flour) %
Softness effect	92.0	8.0
"Cold" effect	94.4	5.1
Good Digestive effect	93.2	6.8
Traditionally used	56.0	44.0
Easily available	47.7	52.3
Easy to cook	56.1	43.9

Table 4 *Preferences of different cereals according to availability and price of rice.*

Preference	Rice Currently available at home Yes	No
Rice (flour or ground)	223	148
Wheat flour	21	57

Chi-Square P <0.00

Preference	Price of rice < Rs. 6.00	> Rs. 6.00
Rice (flour or ground)	156	183
Wheat flour 12	34	

Chi-square P < 0.05

How can we reach more than half (almost 240 million under 3 years) who may suffer anything between 3-6 episodes every year. "Cereal - based

oral rehydration solution" may be the solution to this problem.

Application of an intervention within a home must take into consideration the factors such as cultural beliefs, practices, availability and affordability of different cereals. This study indicates that the majority of mothers in 5 squatter settlements of urban Karachi prefer using rice as the cereal base for preparing oral rehydration solution. But this preference is conditioned by the ready availability and low cost of rice.

These findings, together with experience in using cereal-based OR solution, suggest that it will be advantageous for communities with regard to ready availability of ingredients, better cultural acceptance, increase in self reliance and immediate access to therapy.

However, before taking a policy decision more operation researches need to be done to prove the cost - effectiveness of cereal based oral rehydration therapy.

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MULTI-DRUG RESISTANT FALCIPARUM MALARIA IN A PAKISTANI

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Summary

Previous reports of chloroquine resistant falciparum malaria in Pakistan have been of level R I or R II. We report a case of R III resistant falciparum malaria in a Pakistani visiting Saudi Arabia for Umrah. This report underscores the need for new strategies for treatment of malaria in Pakistan and Saudi Arabia.

Introduction

In Pakistan, Plasmodium falciparum malaria resistant to chloroquine was first reported in Sheikhupura district of Punjab province in 1981 and since then it has been reported from most of the other areas of Punjab and North West Frontier province. However, it has been mainly of level R I with occasional cases of level R II resistance (1-4). Although there is clinical suspicion of level III chloroquine resistance in falciparum malaria, there is no previous proven documentation of such a case in a Pakistani. We report a case of Pakistani falciparum malaria who had not only R III resistance to chloroquine but was also resistant to pyrimethamine-Sulphadoxine combination (Fansidar).

Material and Methods

A 62 years old Pakistani male from Rahim Yar Khan while visiting Saudi Arabia for Umrah Pilgrimage developed intermittent high grade quotidian fever for 5 days before admission to King Abdul Aziz Hospital, Madinah in December 1992. There was no history of travel elsewhere outside Pakistan before his visit to Saudi Arabia and he had used no prophylaxis against malaria. He was conscious and except for the temperature of 39.°C, physical examination was normal. A peripheral blood smear was positive for P. falciparum ring forms with parasites involving about 1% of the RBC. His Hb ranged between 10.5 to 15.5 Gms/dl with WBC count of 5.5 to 8.3 x 10 and platelets ranging between 77 to 191 x 10. His urea, creatinine, liver function tests remained normal. His chest X-ray and EGG were normal. He was given a standard course of 10 tablets of chloroquine with no response in fever and a repeat MP film was positive with to decrease in parasitaemia.

At this stage he was given a course of 3 tablets of combination of pyrimethamine-Sulphadoxine (Fansidar) on third day of admission again without any response and a repeat MP film was still having no change and he continued to have an intermittent fever upto 39.6°C.

A diagnosis of chloroquine and Fansidar resistance was made and he was started on Quinine dihydrochloride (20 mgs/Kg initially followed by 10 mgs/Kg as i.e.. infusion over 4 hours in 5% dextrose eight hourly) plus tetracycline 250 mgs QID on 4th admission day. On 5th admission day the MP film was negative and the temperature had decreased. However, on 6th day of admission he was again having high grade fever upto 39.8°C and MP film was positive for falciparum gametocytes. Blood culture done at this stage was negative. Primaquine 15 mgs BD with Cotrimoxazole forte BD was added to the treatment and he responded to this treatment by subsidence of fever on 8th admission day. Primaquine was continued for 3 days while cotrimoxazole was given for 5 days. Because of the non - availability of any other drugs for resistant falciparum malaria or oral quinine he had to be kept in hospital to complete 7 days of treatment with quinine infusion and tetracycline and when discharged 10 days after admission, his repeat blood films was negative for MP. Only side effect

of quinine was transient tinitis and deafness. He also developed hypoglycaemia (fasting sugar 3.2 mmol/L) which responded to 10% dextrose infusions.

Discussion

The decreased susceptibility of P. falciparum to drugs of the 4- aminoquinolone series, most importantly chloroquine, has placed many countries in a quandary as to the first - line drug of choice. The resistant parasite has now become well established in the endemic areas of South - East Asia and South America and is present in varying degrees in most African countries (5).

To our knowledge this is first reported case of falciparum malaria with R III chloroquine and Pyrimethamine - Sulphadoxine combination (Fansidar) resistance from Pakistan. In view of this report and the recent outbreaks of chloroquine resistant P. falciparum in India, malaria control departments need to be more vigilant to avoid a similar scenario in Pakistan. It also underscores the need for ready supply of injectable as well as oral alternative drugs for resistant falciparum malaria in Saudi Arabia where resistant imported malaria from endemic areas among pilgrims and expatriate workers is a constant threat (6).

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EPIDEMIOLOGY OF SPINAL INJURIES

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Summary

On year study was conducted at Lahore General Hospital. A total of 173 patients were admitted. Eighty eight (51%) were from small towns and villages and Eighty five (48.9%) were from major cities. Majority of patients (41%) were between 21 to 40 years of age. More men (69.7%) were admitted with spinal injuries than women (30.2%). Most of them (39.5%) were from area between 11 to 400 miles around the Lahore General Hospital. Commonest level of injury was cervical region (58.9%). Maximum number of injuries (45.7%) were due to road traffic accident. Causative agent in Twenty two (12.5%) patients sustained firearm injuries. Agriculture related accidents were responsible in thirty three (19%) patients. Among all the 173 patients Electric shock was responsible in four (2.3%) cases. Associated injuries were present in nineteen (10.4%) patients. Twenty one (12.5%) patients died during their stay in hospital. Spinal injury is one of the grave neurosurgical emergencies. It is because it involves young men who are usually the sole bread earners of their families, it has a poor prognosis and its incidence can be reduced by raising safety standards at workplaces and roads.

Introduction

Purpose of this study was to analyse the pattern of spinal injury among the patients admitted in the Department of Neurosurgery, Lahore General Hospital. This is the largest Neurosurgical unit in Pakistan. Within a distance of 900 to 200 miles, Neurosurgical centers of Faisalabad, Rawalpindi and Multan are located. Similarly Orthopaedic units of Teaching hospitals also admit and manage patients with spinal injury.

Materials and Methods

This was a prospective study in which data was collected about all the patients admitted with spinal injury in Department of Neurosurgery from January 1994 to December 1994. Some of the patients were directly received from casualty department while some were referred from peripheral hospitals. Investigations performed were mainly plain X - Rays, and sometimes myclography.

Results

Total number of patients (with spinal injury) admitted in Neurosurgery department, Lahore General Hospital during this period was 173. One twenty one (69.7%) were male and fifty two (30.2%) were female. Eighty eight (51.1%) of these patients were from small town or villages and eighty five (48.9%) were from major cities. We recorded the distance from where the patients were brought to Lahore General Hospital (**Table 1**). Young adults have been the most commonly affected group (**Table 2**). According to level of injury; cervical spine was the commonest region involved **Table 3** shows the incidence of different level involvement. Investigating all the patients (102) with cervical injury spinal level involvement is as shown in **Table 4.**

In one hundred and fifty five (89.5%) cases injury was accidental and in eighteen (10.4%) it was due to assault. When we looked into the circumstances in which the injuries were sustained, it was found that eighteen (10.4%) patients

sustained injuries at their home, seventy nine (45.7%) had road traffic accidents, and seventy six (43.9%) had injuries at their worksite. Out of the seventynine patients with road traffic accidents involvement of different types of vehicles is shown (Table 4).

We analysed the cases who had fire arm injuries. These were twenty two (12.5%) among all the patients with spinal injuries. Among these eighteen (83.3%) had injury at cervical spinal, four (18%) at thoracic, and five (22.7%) at Lumbar spine level. Eight (36.4%) patients were attacked by strangers, while fourteen (63.6%) were fired at by acquaintances. Fourteen (63.6%) cases were due to assault, and eight (36.4%) were accidental. Different types of weapons had been used. Twenty (91.6%) cases were due to hand guns or rifles and in two (81%) cases the weapon was a shot gun. There were nine (41.6%) patients with associated injuries. Pneumothorax was there in two (9%), intra - abdominal injuries in four (18%) head injury in two (8.3%) and limb injury in two (8.3%) patients. Only two (8.3%) patients among this group died. Both had injury to the cervical spine. Out of all these, twenty (91.6%) patients were below 40 years of age and two (8.4%) were above 40 years. Sixteen (72%) patients sustained injury in Lahore or a big city near Lahore while other six (27.2%) had firearm injury in small town or a village.

Agriculture related accidents were responsible for spinal injury in thirty three (19%) patients.

Circumstances in which these occurred are as follows in Table 5.

Four (2.3%) patients had injury while they were working near high tesion street electric wires.

Two patients were WAPDA linemen.

Nineteen (10.9%) patients out of 173 had associated injuries. These included head injury in four (2.3%) four (2.3%) had abdominal injury and eleven (6.3%) patients had injury of either upper or lower limbs.

Twenty one (12.1%) patients died while they were still in the hospital, seventeen (80.9%) of these had bony cervical spine injuries, two (9.5%) had Dorsal spine injury and two (9.5%) had clinical evidence of cervical spine injury but no radiological evidence of bony injury. Four (19%) patients died during the first 48 hours of their admission, fifteen (71.4%) died between 48 hours and first week and two 9.5% died between first week and six month. Four patients (2.3%) received stab wound at their backs. These were at lumbar spine by dagger or butcher's knife.

Discussion

Incidence: About 40 to 50 persons / million / year are hospitalised with spinal injuries[1]. Our drainage area most probably includes a population of 12 millions and our incidence of spinal injuries will be 14 /million / year for our unit. There were twice men compared to women among this group (67.7% vs 30.2%) as has been reported in other series[1].

Age relation: Patients are most likely to be older adolescents and young men[1]. In our series maximum number of patients were in the age range of 11 to 20 years. Among children 70% of spinal injuries occur in boys[2]. In our study it was seen that 3.1% of patients were below 10 years of age, and four or 66.6% were boys. Elderly patient who presents with a history of a fall or minor trauma may have a cervical spine injury[3]. In our series five (3.1%) patients were of age 61 and above. Four patients had history of just by tripping over and landing on the floor.

Level of injury: 60% of total spinal injuries involve cervical spine[4]. In our study, cervical spine injuries comprise 60.4% of total spinal injuries. It has been noticed that recently injuries occur in younger age groups, patients arrive sooner, have less severe cord injuries and higher frequencies of motor vehicle, sports and recreational accidents but fewer work related injuries[5]. We do not have published statistics regarding spinal injury in Pakistan, therefore it is hard to know whether its pattern is changing.

Causes of injury: in patients with tetraplegia following were the causes in previous studies. Motor vehicle accidents (54%), sport related (46%), violence (2%). Majority of spinal cord injuries are transport related, with motor vehicle collisons being the chief cause[1]. we have noticed that accidents at work &76 cases or 43.9%) nearly equal those of road traffic (79 cases or 45.7%). It suggests that our safety standards at work are poor.

Road traffic accident: Wagons hitting another vehicle or a pedestrian are the commonest cause

traffic accident. It is probably due to well overspeeding and overloading. Role of in preventing spinal injuries is well [7] in our system use of seat belts is non

Firearm injuries: were present in twenty two (12.5%) patients. Predominantly men were involved (83.3% vs 16.6%). Commonest level of injury was cervical spine (thirteen or 58.3%). Assaults were more common than accidents (fourteen or 66.6% vs seven or 33.3%). Hand guns or rifles were the commonly used weapons. Nine (41.6%) patients also had associated injuries, commonest were had Intra - abdominal injuries in four (16.6%). Two (8.3%) patient among this group died. He had bullet injury at C^7. Young men below 40 years are involved in such accidents. Firearm injuries have been seen to be more commonly involved in big cities as compared to small towns[6].

Agriculture related injuries were present in fourteen (8.3%) of patients. Fall from tree was the commonest cause. Other causes were hit by cattle ox, ladies had their duppatas (scarfs) caught up in tension belt of grass shredder and sustained acute hyperflexion injury of cervical spine, while traveling on tractors on uneven ground, vehicles bumped and they jumped up and out of their vehicles. Agriculture related machinery and vehicles are used by untrained persons men or women, leading to higher rate of accidents.

Two patient (1.2%) were assaulted by *dacoits*. These were beaten up by kicks, punches and with bars.

In cases of electric shock related injuries, the electric shock led to violent jerks and the victim landed on the ground two injured the lumbar spine and the other two injured cervical spine. These have been due to low lying high tesion electric wires and improper safety hardware used by WAPDA linemen.

Catchment area There was no marked difference in number of cases from villages and small towns (51.1%) or from major cities (48.9%)[8]. Maximum percentage of patients (39.5%) came from a distance between 10 to 40 miles around Lahore General Hospital. The reason is hard to explain. It might be because the area around Lahore General Hospital within 10 miles is not well populated. On the other hand patients who belong to areas more than 40 miles away from the Hospital, either do not survive the trauma and general stress of transport under insecure circumstances, or are treated by local practitioners, Quakes, Hakims and Pahalwans.

CT and Magnetic Resonance Imaging, are commonly used investigations in developed countries[8]. In our set up we have been using plain X - Rays and in selected cases Myelography. In a study by Allen et al 1982, 53 were patients reviewed. No apparent bony injury or type (unknown), was present in 11.3% [4,10]. Among all the patients with cervical injury it was found out the commonest level of injury has been C4 that is 31%. The syndrome of traumatic spinal cord injury without spinal column fracture is well known and predominantly involves the cervical spine of children[2]. In our patients eleven out of one seventy three had evidence of spinal injury but no radiological evidence of bony injury Traumatic facet dislocation of the spine, unilateral or bilateral, may or may not be associated with a fracture[4,5]. Fractures of the atlas comprise approximately 10 percent of all injuries of the cervical spine and about 2% of all spinal injuries[9]. In our study incidence of C1 fracture has been low; i.e. 1.7% after Jefferson fractures. Similarly in our series C2 fractures are rare as reported in the literature[9].

Injuries to the middle and upper thoracic vertebrae represent less than 10% of the spinal injures[1,12]. Associated spinal cord injury occurs in 70 to 85%[1]. In our study 21.8% had thoracic spine injuries, and associated spinal cord injury was present in 89% Thoracolumbar spine fractures, occur in less than 2-3% of spinal injuries[13,14].

Associated injuries injuries to the Thoracic and Lumbar spine are associated with multiple fractures of the ribs and extemities as well as with thoracic and abdominal visceral injuries[15]. Among our patients, 10.4% has associated injury, commonest being limb injuries (5.1%).

Twenty one (12.5%) patients died, while they were still in the hospital. Among this group patients with cervical spine injury were predominant (forty three or 81.7%) as reported in previous studies[16]. The highest mortality has been was within first week of injury. In these patients, eleven (25%) has associated injuries, seven had head while four had limb injuries. Thus patients who died also had higher incidence of associated injuries with their complications (25% vs 10.4%)[17,18].

Conclusion

Spinal injury commonly involves young men who are sole bread earners of the family. Spinal injury is associated with high morbidity and mortality. With increased safety standards at worksites and roads its incidence can be reduced. Medical first aid system of ambulances and paramedical staff is needed if we want to improve the prognosis after such injuries.

Table 1. *Distance of incident from Lahore General Hospital*

Distance in miles	No. of cases
Less than 10	25 (14.5%)
11-40	65 (39.5%)
41-90	59 (34.3%)
91-200	20 (11.4%)

Table 2. *Age Incidence of 173 patients with spinal injury*

Age in years	No. of patients
Below 10	5 (2.8%)
11-20	49 (28.3%)
21-40	71 (41.0%)
41-60	43 (24.8%)
Above 60	5 (2.8%)

Table 3. *Spinal level of injury*

	No. of cases
Cervical	102 (58.9%)
Dorsal	39 (22.5%)
Dorsolumbar	6 (3.45)
Lumbar	26 (15.0%)

Table 4. *Vehicle involvement in 79 cases of road traffic accidents*

Type of vehicle	No. of cases
Pedestrian hit by any vehicle	15 (18.9%)
Wagons	15 (18.9%)
Tractors	12 (15.8%)
Trucks	11 (13.9%)
Motor bikes	10 (12.6%)
Buses	8 (10.1%)
Tonga/Donkey cart	5 (6.3%)
Car	3 (3.7%)

Table 5. *Causes in agriculture related injuries*

Cause of injuries	No. of cases
Fall off tree	19 (57.5%)
Tractor accidents	9 (27.2)
Hit by cattle	3 (9%)
Agromachinery related	2 (6%)

Table 6. *Cervical spine involvement of different levels*

Level of injury	No. of cases
C1	2 (1.9%)
C2	
C3	2 (1.9%)
C4	32 (31.3%)
C5	28 (27.4%)
C6	23 (22.5%)
C7	15 (14.7%)

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COMMUNITY GERIATRICS - PROBLEMS AND PREVENTION (A STUDY OF MALE ELDERLY FROM THREE VILLAGES OF PUNJAB)

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Summary

With the better health care and increase in the quality of life, the number of Senior Citizens are increasing day by day. In Pakistan the concept of gerontology is new and aged people are facing so many problems. Administered mixed (open ended and close ended) questionnaire was designed to collect the date from three villages of Punjab. n = 200 (All were male). 74% of the elderly reported their health as unsatisfactory and 26% were enjoying good health. 90% were illiterate. 47% had eye problems, 40% joint problems, 35% dental problems. Other problems enlisted were sleep disturbance, hearing problems, incontinence, hypertension, bronchial asthma, diabetes mellitus, RTI and memory loss. Major disability with dependency in three or more Activities of Daily Living (ADLs) was 7%. Two third of the elderly complained of not being provided the proper health care. Problems other than health are Economic Problems, Domestic Problems, Loneliness and disobedient children. Majority of the elderly suggested that all medical facilities along with the Elderly allowance should be paid by the Government Combined family system should exist and social clubs at Mohalla level must be organised. Last but not the least they requested for more attention and love from family members and Doctors.

Introduction

"And you show kindness to parents. If one of them or both of them to attain old age with the say not 'File' unto them nor repulse them but speak unto them a gracious word and lower unto them the wing of submission through mercy and say. My Lord have mercy on them both as they did care for me when I was little" (1).

Ageing is a universal process, Old age should be regarded as a normal inevitable phenomenon. In the words of Sir James Sterling Ross "You don't heal old age. You protect it, you promote it, you extend honouring a person as a Senior Citizen.

The population census data shows that 5.7% of the total population of Pakistan in 1951 was that of individuals 60 years or more. This proportion was 6.9% in 1961, 7.3% in 1973 and 6.7% in 1981 (3). It will become 8.64 million in 1996, 10.27 million in 2001 and 11.88 million in 2006 AD (4). The age distribution of Pakistan's population is shifting towards the older age group. Because of the growing interest of the nation in family planning and consequent lowering of the birth rate, the population pyramid of the future will shrink at the bottom and grow wider at the top. By the year 2000, the percentage of the population of 60 years or more is expected to increase upto 10 15% (5). This phenomenon merits an organized Community Programme for the health and welfare of elderly.

While in the Western world this is not a new interest, in Pakistan it has not received any one's interest that it deserve. World Health Organization Regional Advisory Panel on Health Care of the elderly in its report (6) says that none of the countries of EMR has a national programme for creating mass awareness about the special needs of the elderly population and their vulnerability to several hazards, and none of the EMR countries has a comprehensive national policy for the welfare of the ageing population.

Materials and Methods

A survey was conducted in three villages of [illegible] province (Chak No. 60 Shumali and Kot [illegible]wan of District Sargodha) and (Miana Gondal [illegible] District Mandi Bahawaldin). Sample size was [illegible] sampling technique was simple random sample. Questionnaire with mixed questions (open ended and close ended) was designed, pretested and then face to face interview was carried out. All respondants were males 60 year of age.

It was very difficult, time consuming and up hill task to extract information out of old people. Number of them responded that they had no problems worth mentioning. It could not be believed. Probably they have learned to live with their problems. What we term as problems become part of their life. They don't take the hard ships of life as problems. It has become their second nature.

Results

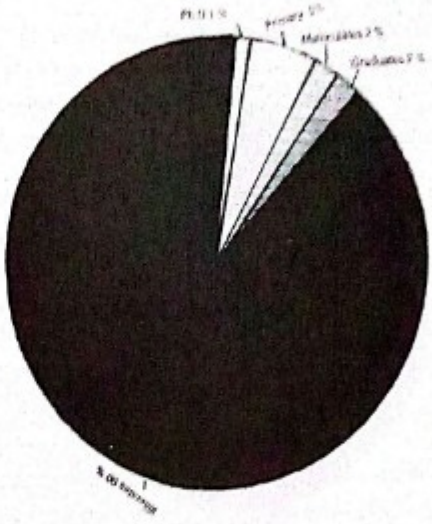
All respondants were male from Rural of Punjab. 42% were from 60 - 64 year, 16% from 65 - 69 years, 20.2% from 70 - 74 years, problems. The common eye problem was cataract.

Hearing impairment was 30%. A US study in 1984 (8) established hearing impairement ranging from 30 - 60% among men over 65 year of age. In addition to potentially profound limitations in an individuals ability to communicate with others, impairment in both these sensory systems are associated with significant limitations in performing activities of daily livings as well as with depression.

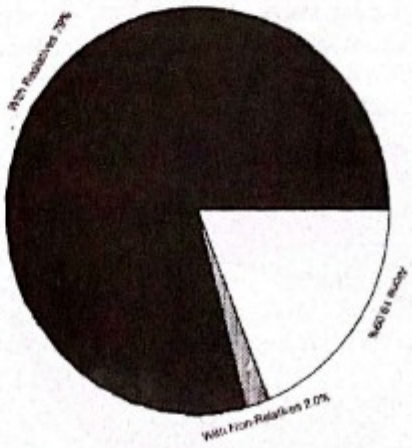
Early detection and intervention may reverse or delay sensory impairements. Surgical treatment of cataract with lens implantation has been shown to improve physical function as well as vision. Hearing aids represent the main stay of hearing rehabilitation, which, if used effectively, can reverse psychosocial and particularly psychosocial disability associated with hearing loss.

80% of the elderly were not satisfied with present health care facilities, the main reasons were:-

1. Medicines are not available all the time.
2. There is no special care for elderly.
3. Casual attitude and apathy of hospital staff.



Literacy Level



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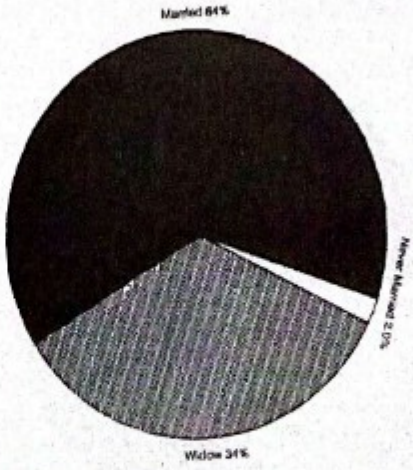

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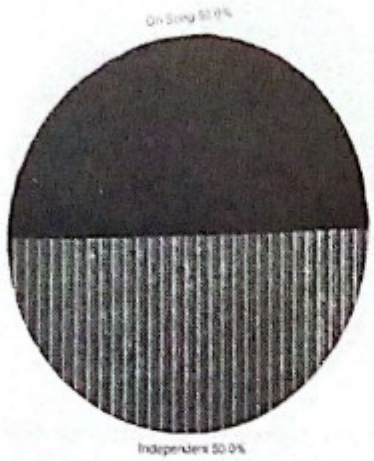
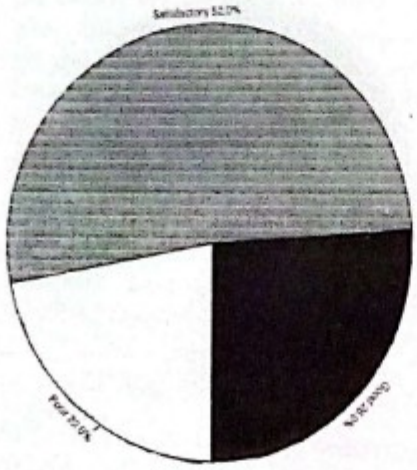
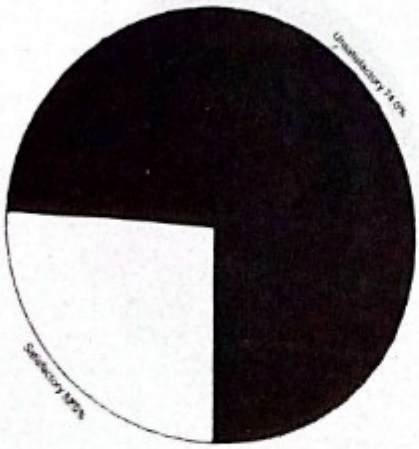


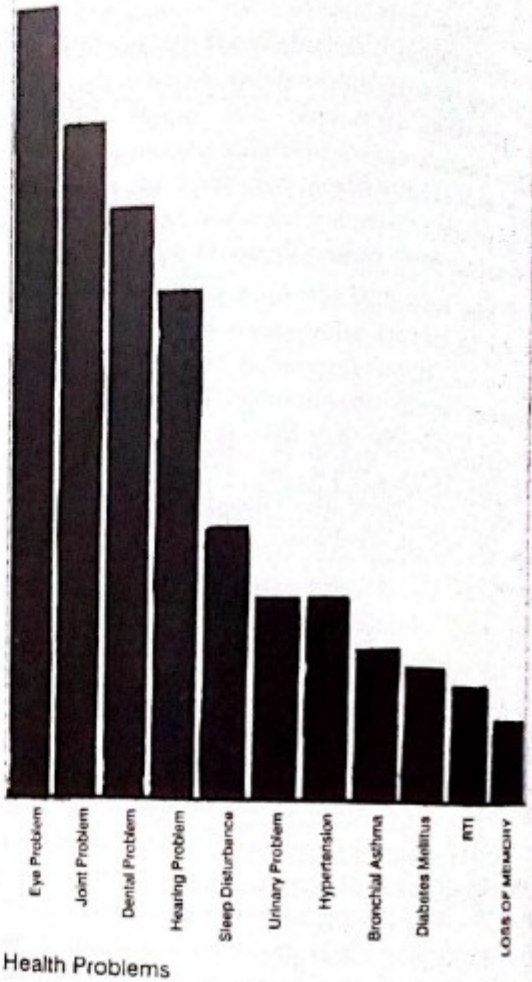
Dependency



Relation with Relative



Health Status



Health Problems

4. No medical care for poor.
5. Consultants are out of approach.

Problems other than health are following:-

1. Loneliness.
2. Disobedient children.
3. Economic problems (Finance)
4. Domestic problems.

Most of the elderly gave following suggestions for their better care:-

1. All the medicines should be provided by the government.
2. Special care for the elderly should be provided in the hospitals.
3. Elderly allowance should be paid by the government.

mbined family system should persist.

There is need of health education.

Islam has given great respect to the elderly, people should act upon the teachings of Islam.

7. Geriatric health insurance.

8. Pension should be increased.

9. Old people's homes should be set up by the government.

10. Social clubs at mohalla level should be organised to solve problem of how to pass leisure time.

11. They want more attention and love from families and doctors.

Discussion

According to WHO (3), in 1950, there were approximately 200 million persons 60 years of age and over through out the world. By 1975, their number had increased to 350 million by the year 2000 and 1100 million by the year 2025. It means increase of 224% since 1975. During this same time period world population as a whole is expected to increase from 4.1 billion to 8.2 billion, as increase of 100%.

In Pakistan, the percentage of elderly is increasing day by day. The rise of life expectancy in Pakistan shows evidence of increase in the population of senior citizens from current 8% level to 20% in the foreseeable future. This constitutes a special risk group which needs an infrastructure for the provision of personal health services.

According to survey conducted major health problems faced by the male elderly were defective eyesight, joint problems, dental problems, hearing problems, psychiatric problems and urinary problems. As a whole, 74% of elderly reported their health as unsatisfactory and only 26% were found to be healthy. It shows that majority of our aged population is sick. In a study conducted in 1972 (3) it was reported that 25.3% of the rural males reported that their health is satisfactory.

90% of rural males elderly were illiterate, it reflects that literacy level among rural aged population is still much lower. According to previous surveys the literacy rate among senior people was 133.4% in 1973 and 10.3% in 1981, for the rural populations (3). According to present survey, literacy rate in the male rural elderly was 10%. It shows no change in the literacy rate of rural populations over the period of time.

In 1951 percentage of widowed male was 32.1% corresponding figures in 1961 and 1973 were 25.2 and 20 (3). According to present study 34% of the elderly were widowed. It shows that percentage of widowed elderly has increased over this time period. This is due to the fact that still the life expectancy of a male is more than a female in Pakistan. These results also reflect that Health Care facilities in rural areas are much more neglected.

Elderly people deserve and should receive the best medical care available, given with discrement, enthusiasm and kindness. The extensive nature of illness in the elderly means that the physician in geriatric medicine has to keep up to date with advances in knowledge management and therapeutics in the wide range of subjects, not only in his own speciality, but also in other spheres which have implications for the treatment of the older person (7).

Despite the best efforts of primary and secondary prevention and health promotion, the majority of older persons will develop one or more potentially disabling medical conditions. Under these circumstances the goals of health care should be early intervention and rehabilitation to limit disability (8).

In all EMR countries the majority of the elderly live in rural areas. The primary health care workers of today are neither trained in health care of elderly nor do they realize the special needs of this segment of population. The WHO Regional Advisory Panel on Health Care of Elderly (RAPHCE) was established in 1993 by the Regional Director. The main objective of RAPHCE was to review and endorse a Regional strategy for WHO programme on Health Care of the elderly for the decade covering the period 1992 - 2001.

A report of the International Labour Organization (9) says "A major concern is the increasing old age dependency on the economically active population. It has been estimated that if low level of economic activity of older persons persist by 2025, there may be as few as 1.5 active persons for each ageing dependent.

Recommendations

1. Ministry of Health, Government of Pakistan, should conduct a nation wide survey on elderly to provide salient information regarding demography, living conditions, social support, economic dependency, governmental and non - governmental support, health profile, major morbidities, major causes of impairment and support from health care system.
2. Awareness must be created among general population, which included families within which the aged live and among aged themselves. Mass awareness campaigns need careful planning in collaboration with media specialists usually working with the information sectors of the Government Both audio - visual and print material are to be utilized in these campaigns.
3. Development of a national strategy and a national policy is need of the time.
4. Government support should be provided to the elderly population in the form of an old age pension, subsidies for public transportation, food, drugs and even housing.
5. Primary Health Care will have to take major load of providing health care to elderly especially in rural areas. Health Education of the primary health care worker to provide health care to elderly is a must. At present PHC workers are not trained in this field and they provide curative services to elderly exactly as they do to any other person without any awareness regarding the special needs of the elderly or their vulnerability to certain simple hazards in life.
6. Research studies on health problems of the elderly should be encouraged.
7. Health care of the elderly should be included in the curriculum of under graduate / post graduate Doctors and nurses / paramedical staff.
8. Geriatric wards for the elderly patients are non-existent even in the teaching hospitals. All the teaching hospitals should have geriatrics units.
9. Provision of old age homes and [illegible] institution in the urban areas. [illegible] migration, 4% from rural to urban areas [illegible] will shift the load of elderly to the [illegible] Present socio - economic [illegible] compounded by the migration of young [illegible] to urban areas are gradually producing [illegible] situation where old age homes or [illegible] institutions will be needed).
10. Last but not the least, we all should [illegible] respect, love and affection to all the [illegible] citizens for they are the people who have [illegible] years of useful experience and are [illegible] assets of society. They don't want much [illegible] only and only love from all of us.

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SPINAL TUBERCULOSIS: EASY TO DIAGNOSE DIFFICULT TO MANAGE

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Summary

The author reviewed 60 cases of spinal tuberculosis treated from Jan. 1993 to Jan. 1995 at Lahore General Hospital. Clinical findings included back pain in 47 (79%), paraparesis in 40 (66%) and kyphosis in 31 (52%) patients. Less common features included fever sensory disturbance and sphincter dysfunctions. Predominant vertebral body involvement was present in 26 (43%) and marked : bone collapse in 11 (18%) patients. Intraspinal granulomatous tissue causing neurological dysfunction in the absence of bone destruction was seen in 33 (55%) cases.

All 60 patients received antituberculous medications. Laminectomy and debridement of extra granulomatous tissue, or abscess drainage was done in 43 (71%) patients. Laminectomy and bracing in 8.3% biopsy followed by bracing in 11 6% and bracing only in 3.3%. We didn't perform internal stabilization in any of our patients. An average follow-up time of 6 months Courses of Antituberculous therapy (ATT) shorter than six months were invariably associated with disease recurrence.

It is suggested that any young female from poor social background with backache and positive family history of tuberculosis should be examined and investigated fully for tuberculous spine with appropriately selected treatment, modality and compliance of the patient, satisfactory outcome can be obtained in majority of patients.

Introduction

Spinal tuberculosis, traditionally referred to as Pott's disease occurs in less than 1% of patients with tuberculosis. The insidious nature, its gradual progression and its varied clinical presentations often result in delayed diagnosis. The frequent absence of concurrent pulmonary involvement heightens the diagnostic challenge, though familiarity of the disease among physicians helps in early diagnosis. It is a fact that spinal tuberculosis is a potentially curable disease but insidious onset may lead to delayed presentation and serious sequel. Aims of our study was to find out incidence and assess success of our treatment methods.

Materials and Methods

This prospective study was carried out at Lahore General Hospital over the period of two years. Total number of patients with spinal pathologies of acquired origin admitted during the course of two years was 623. Out of these, 452 patients were admitted due to nontraumatic causes. These were, Spondylosis. Tumours and Spinal tuberculosis (Caries Spine). There included 60 (13 2% of 45% patients) patients, admitted with Spinal tuberculosis (Caries). All the patients with clinical diagnosis of tuberculous spine but negative histological evidence were excluded from the study. Twenty seven patients, were admitted during the first year and 33 patients during the second among patients with caries, 57 (95%) underwent surgical procedure. There were 39 (65%) women and 21 (35%) men. Patients mainly belonged to Punjab and North west frontier province. Nearly all the patients belonged to lower socioeconomic group. Only two of the patients belonged to middle social class. Age range was from 14 to 78 years but mainly young patients between 11 to 20 years were affected with the disease (See Table No. 1)

Table 1. *Age Incidence in Years*

Age incidence in years	Patients
11-20	30 (50%)
21-30	5 (8.3%)
31-40	3 (5%)
41-50	4 (6.6%)
51-60	5 (8.3%)
61-70	10 (16.6%)
71 and above	3 (5%)

Results

At the time of presentation, common clinical findings were back pain, paraparesis and kyphosis. The relative is shown in Table No. 2.

Table 2 *Clinical findings in patients*

Clinical Findings	Patients
Back pain	47 (79%)
Paraparesis	40 (66%)
Kyphosis	31 (52%)
Fever	27 (45%)
Sensory disturbance	20 (34%)
Bowel/Bladder dysfunction	19 (31%)

The erythrocyte sedimentation rate was measured in all of the individuals and was uniformly elevated above 40mm/hr.

Diagnostic imaging studies included plain roentgenograms in all cases (100%), computerized tomography (CT) scans in (18%) myelogram with CT scan in (7%), and magnetic resonance imaging in (1%), Commonest level of involvement was dorsal spine (see Table No. 3).

Table 3 *Relative incidence of spinal level involvement*

Spinal Level	Patients
Cervical	3 (2%)
Cervicodorsal	2 (3%)
Dorsal	33 (55%)
Dorsolumbar	6 (10%)
Lumbar	17 (28%)

Chest X-ray were obtained in all cases and revealed evidence of active or healed pulmonary disease in (64%). More that 50% had previous extraspinal tuberculosis and the association is shown in Table No. 5.

Table 5 *Evidence of associated Tuberculosis*

Association	Patients
Previous extraspinal tuberculosis	31 (52%)
Caries as initial manifestation	29 (48%)
Family history of Tuberculosis	10 (17%)
Concurrent drimary tuberculosis	6 (10%)

Radiologically, predominant vertebral body involvement was present in 43% marked bone collapse with neurological compromise was seen in 60% (see Table No. 4).

Table 4 *Pathological findings among all the patients with caries*

Pathological findings	Patients
Abscess	12 (20%)
Vertebral body involvement	26 (43%)
Collapse	11 (18%)
Granulations	33 (55%)

All patients received combinations of Rifampicin, Myambutol. Isoniazid, and Pyrazinamide. Doses were given according to body weight of the patient. We preferred the preparation (Myrin P) in which all the drugs are included in a single preparation, for at least 18 months.

Surgical procedures included, simple biopsy to decompressive laminectomy, drainage of abscess and excision of granulation tissue. In cases with unstable, painful spine external bracing as a method of stabilization was used (See Table No. 6).

Treatment modalities used in 60 cases of Caries

...ent methods	Patient
...dication only	3 (5%)
...opsy and medication	7 (11.6%)
...aminectomy decompression	43 (71.6%)
Laminectomy and stabilization (bracing)	5 (8.3%)
Stabilizatioin (Bracing)	2 (3.3%)

Forty two (70%) patients were lost to follow up none of the patients died. Average length of follow up was 6 months. At six months, 66% of patients who presented had mild or no neurological deficit, while 34% had significant deficit. Patients with significant deficit had motor power of grade III or less, were unable to mobilize themselves. These patients also had impaired sensations to the extent of having bed sores Mild neurological deficit means that inspite of sensory and motor deficit the patient can mobilize with support and spend *independent life (see Table No. 7). Good indicator of prognosis has been presentation before paraparesis.

Table 7 *Status at Six months follow up*

Results of treatment	Patients
Mild or no deficit	40 (66%)
Significant deficit	20 (34%)

Courses of antibiotic therapy shorter than 6 months were inevitably associated with disease recurrence twelve patients stopped Antituberculous therapy prematurely worsening of symptoms and rise in ESR was noticed among these patients. Further counselling encouraged them to take medication regularly.

Discussion

Spinal Tuberculosis has to be diagnosed and treated early. The consequences of a delay in presentation or diagnosis may include irreversible neurological deficit and even death. It is incumbent in the physician to become familiar with the varied manifestations of this infection based on clinical and radiographic findings. Tuberculous spondylitis is not difficult to differentiate from metastases, myeloma, lymphoma or pyogenic vertebral osteomyelitis. A history of tuberculosis, a positive skin test and an elevated erythrocyte sedimentation rate are useful diagnostic clues, but these are not uniformly present. We don't perform Tuberculin test, because in our population it is positive in more than 90% as compared to western studies, where it is reported to be positive in 62%.

Plain roentgenograms reveal endplate disruption and bone destruction[5], CT scan delineates bone involvement and paravertebral abscess extension, intratheeal contrast administration shows the degree of theeal sac compression[6,7] and MR imaging demonstrates the extent of soft tissue involvement. The diagnostic procedure of choice is MR imaging which reveals a ring enhancing, hypo -- to isointense lesion on T_1-weighted images and a hypointense area with a variable central hyperintensity (reflecting caseating necrosis) on T2-weighted images.

Culture of Mycobacterium from material obtained at the time of an open procedure can be diagnostic in 68% of cases. Our diagnosis was mainly based on Histopathology (caseous necrosis and Langerhan's Giant cells). Due to lack of resources we have been unable to use the techniques of Mycobacterial culturing which is also a time consuming procedure. In future use of DNA amplification techniques may allow for more rapid and accurate identification of tuberculosis infection.

Surgical intervention may be a diagnostic biopsy drainage of a large paraspinal abscess, decompression of neural elements, correction of spinal deformity, and or stabilization of the spine[11]. Patients who are neurologically intact without significant bone destruction are generally treated with biopsy, antituberculous medications. External bracing is used for painful and unstable spine.

There were paraparesis of more than 4 weeks duration and unstable spine with involvement of both anterior and posterior components of the vertebral segment. All of these patients had previous history of Tuberculosis Any surgical maneuver would have made spine more unstable, leaving no chance of neurological recovery.

There were 7 (11.6%) patients with extensive involvement of vertebral body leading to unstable segment with long standing neurological deficit (more than 4 weeks). These patients didn't have any previous history of tuberculosis. Biopsy was taken before starting anti Tuberculous therapy.

Diagnostic biopsy followed by external bracing was used in 11.6% of all the patients with Spinal Tuberculosis.

In cases where neurological compression was of short duration (less than a week), laminectomy and decompression was done in ideal circumstances we should treat the patients within few hours of development of neurological deficit. Unfortunately our patients present late, sometimes weeks after complete sensory, motor and sphincter control loss.

In the majority of our cases, the presence of neurological deficit resulted from either marked bone collapse with spinal canal compromise (true tuberculous spondylitis) or a granulomatous epidural mass producing effect without significant bone involvement. Because both epidural infection and bone destruction typically progress for a variable length of time after antituberculous chemotherapy is instituted the presence of even mild neurological deficit may be taken as a strong indication for surgical intervention[12]. In our series there was no evidence of intramedullary tuberculomas but in some series these are reported as high as 7%[13,14]. It has been our experience that patients with epidural granulomatous tissue in the absence of significant bone collapse may be treated satisfactorily with simple decompressive laminectomy and debridement. However when vertebral body involvement is significant enough to produce wedging and kyphosis.

An aggressive debridement and stabilization procedure is indicated[15]. We have been successfully using external bracing to stabilize the spine. We are not in favour of using internal fixation devices. We think that firstly wound healing is further delayed. Secondly, bones are already weak to bear any stress of weight bearing anyway, and thirdly, metal pieces get loosen up at bone metal interface[17]. In some series, 95% of the patients who were initially managed nonsurgically later required fusion procedures for progression of inadequately treated osteomyelitis[1]. Large controlled trials have examined the efficacy of various treatment regimens for spinal tuberculosis, confirming the advantage of radical surgery combined with chemotherapy in such instances. Anterior fusion procedure sometimes fail, producing kyphosis[16]. Therefore it has been suggested that these patients may be treated best by combined anterior-posterior fusion to prevent delayed instability.

The optimum treatment of spinal tuberculosis remains controversial and should be individualized in each case based on present guidelines. It is recommended that antituberculous chemotherapy, consisting of at least two and preferably four medications, be administered for a period of at least 12 months though some studies have shown success with three drugs.

Conclusion

The incidence of tuberculosis in Pakistan is high, spinal involvement of this disease is undoubtedly frequent. We reviewed 60 cases of spinal tuberculosis treated over 2 years period. In our experience, most patients had granulomatous and debridement. There were smaller groups who needed, lesser procedures as biopsy or external bracing as method of stabilization. With appropriately selected treatment modality, and compliance of the patient, satisfactory outcome can be obtained in majority of the cases.

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