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An Algorithmic Method for Management of Mental Health Problems in Developing Countries

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Summary: A new problem-oriented cross-cultural method has been developed to identify the appropriate management of mental health problems in primary-care settings. It is designed to be used by multipurpose health workers in out-patient clinics in many developing countries. Presenting mental health problems in many cultural settings can be placed into one or more of eight behaviourly determined categories. After this initial categorization an algorithmic process is used to determine the sequence of observations which must be made in order to identify the appropriate management. The system allows for variations in available resources and local constraints. We outline the design principles of this algorithmic method and the rules for using it, and describe a training programme developed to teach people to adapt it and use it effectively. The evaluation studies that have been done in different developing countries confirm that the method is acceptable and efficient, and gives management decisions with a high degree of repeatability.

Since 1976, the World Health Organization (WHO) has undertaken a programme to develop and evaluate techniques for assisting and improving delivery of primary health care. This work led to the development of problem-oriented sets of algorithms for the identification and management of various health problems by health auxiliaries in developing countries (Essex, 1978). An interlinked set of algorithms presented in 64 flow charts was developed to identify accurately over 250 organic illnesses in such a way that each illness would be diagnosed when it presented with any of its possible presenting symptoms. These algorithms were designed for use in any developing country, to diagnose regionally specific illnesses as well as those universally prevalent. These 64 charts did not include mental health problems because the specific algorithmic techniques developed for somatic conditions could not deal appropriately with the complexities of mental illnesses.

In 1977, the Division of Mental Health of the WHO supported a feasibility study into the development of problem-oriented algorithms for identifying and managing mental 'illnesses', for use by intermediate-level health personnel in developing countries (i.e. multipurpose health workers as opposed to medically qualified staff). This came about as a result of the great desire in the WHO for some realistic and effective mental health training in developing countries, where it is not unusual to find one psychiatrist serving up to 20 million people and any reliance on a psychiatric model of care must be justly by-passed. It was never considered that any such programme should produce 'village psychiatrists'.

Because many countries are training multipurpose health workers to identify and manage physical and mental health problems within the limits of available resources and local constraints, our research was intended to benefit these health workers. We considered it important to explore the possibility of an algorithmic approach to mental health problems in view of the considerable success that the recent use of flow-chart techniques has had in increasing the effectiveness of midwives, intermediate-level health workers, and village health workers in developing countries (Ahmed, 1978; Wankiiri, 1980; Amaro and Essex, 1977; Essex, 1980, 1981).

Present methods of training multipurpose health workers follow traditional patterns of medical training for doctors and emphasize diseases rather than problems. Such an approach is not sufficient for training in the rapid pragmatic processes required in the provision of basic care and screening for large numbers of outpatients. Other teaching methods are needed to enable special problem-oriented skills to be acquired.

Until now any attempt to include mental health training in the syllabus for multipurpose health

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workers has resulted merely in a few hours of lectures by a consultant psychiatrist, with no psychiatric element in the final examination. Recently there has been increased interest in training these cadres more effectively in behavioural science and its relationship with mental health, but mental health training is not management-oriented, and the complex practical decisions which face health workers away from urban centres are rarely analyzed in hospital training programmes. There is therefore a need for a new approach to the identification and management of mental health problems outside the hospital.

The 1977 WHO research programme to develop and evaluate a system of identification and management of mental health problems set up the following goals. It should:

1. Be usable in many different countries
2. Be usable by intermediate-level health workers in out-patient clinics
3. Start with the presenting problem
4. Identify with acceptable levels of accuracy whether the presenting problem is caused by a physical or a mental illness
5. Indicate the most effective and appropriate management
6. Indicate what to do when transport or drugs are not available
7. Identify patients needing follow-up management
8. Outline what to look for, ask for, and do at each follow-up visit
9. Standardize management to ensure a high quality of mental health care
10. Enable health workers to record easily the illness and its management without the use of disease names
11. Allow managements to be adapted to cope with the limits of local resources and constraints.

The method used to develop flow charts to fulfil the above objectives will now be described.

System Design

Management outcomes

In the development of a flow chart, the primary requirement is a goal, clearly defined in functional terms. Each of the above objectives had therefore to be translated into specific operational goals.

The flow charts developed for somatic illnesses lead to diagnoses. It would have been better if they had been extended so as to lead to management of the diagnosed condition, but because of the range of managements to be provided, including necessary alternatives in case of shortages or lack of transport, this process has yet to be completed. In the case of mental-health problems the situation is quite the reverse: a fundamental feature of primary care is that there are only a few possible managements available. Moreover, treatment of mental disorders is less frequently specific to a diagnosis than in other branches of medicine, so the appropriate management can be sought directly. We therefore decided to design a system which would lead directly to one of the limited number of managements available, without requiring any psychiatric diagnosis. This basic decision eliminated the need for health workers to attempt psychiatric diagnoses, something that we very much wanted to avoid. It also allowed us to dispense with observations which had only diagnostic significance and no relevance to selection of management: this enabled the system to be more consistent, robust, and uncontrived.

While dispensary workers and other health personnel in developing countries often act in the place of doctors, within the limits of their training and experience, we did not wish to make any attempt to train them as psychiatrically qualified personnel: the need is for primary care, screening, support and intervention by non-psychiatrically trained multipurpose health workers.

Categorizing presenting problems

In the development of the flow charts for diagnosis of *organic* illnesses, the starting point was to identify presenting problems: these formed the entry points into the algorithmic process. It was found that most physical illnesses in different societies and countries presented with a finite number of symptoms. With mental health problems, on the other hand, not even extensive literature reviews could identify any acceptable, feasible, appropriate cross-cultural categories of presenting mental health problems. Data from the WHO Collaborative Study on Strategies for Extending Mental Health Care (Harding, 1980) did however provide information on the presenting problems of thousands of patients seen in many developing countries. In addition, we analyzed hundreds of actual cases from our own experiences in developed and developing countries—in primary care, in psychiatric and clinical psychological settings, in local dispensaries and in mental hospitals. It was found that the almost unlimited number of specific presenting problems could be assigned to at least one of eight categories. These are shown in Table I.

The categories of Table I are not ordered arbitrarily. They have been carefully ordered so that the patient is assigned to the first appropriate category. As a fail-safe mechanism for situations in which the first appropriate category might be missed, alternative pathways have been designed into the system, but the principle of choosing the earliest pathway remains important.

These eight categories form an empirically derived

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TABLE I

Categorization of presenting problems

PRESENTING PROBLEM	CATEGORY
Violence to others	1 **Violence to others**
Violence to self	2 **Violence to self**
Holds incredible beliefs Hears or sees things others cannot	3 **Delusional (including hallucinations)**
Slow response to commands or questions Withdrawn behaviour	4 **Withdrawn behaviour**
Speech or sounds which do not make sense	5 **Abnormal speech**
Unusual or bizarre behaviour Unable to sit still Does not stop talking Runs or jumps about Throws or smashes things Waves arms Shouts or screams Other purposeless movements Does not know own name or address	6 **Abnormal behaviour**
Expresses fear Continuous shaking of hands Feels heart beating Weeping Faintness	7 **Anxiousness**
Feels depressed, sad, hopeless Loss of interest in activities Feels he/she has sinned greatly or deserves great punishment Specific worries Sleep disturbances Many symptoms but no cause found	8 **Depression**

hierarchy without any demonstrable theoretical basis. Technically they might be thought of as 'fuzzy sets', in which imprecision in determining membership is due not to randomness but to a lack of well-defined boundaries. 'Such complex and ill-defined systems pervade the life- and social sciences and are also found in the physical sciences where systems may be too complex to admit to analysis by conventional means' (Saaty, 1972). The categories should only be thought of as defining points of entry into the flow charts: they are in no way indicative of final outcome, diagnosis, or management.

After analysing hundreds of presenting mental health problems seen in varied cultural settings, no presenting problem was identified which did not fit one or more of these categories, although we suggest that this finding needs to be confirmed by further field studies, which may also indicate a need for minor adjustments in the determination of each category.

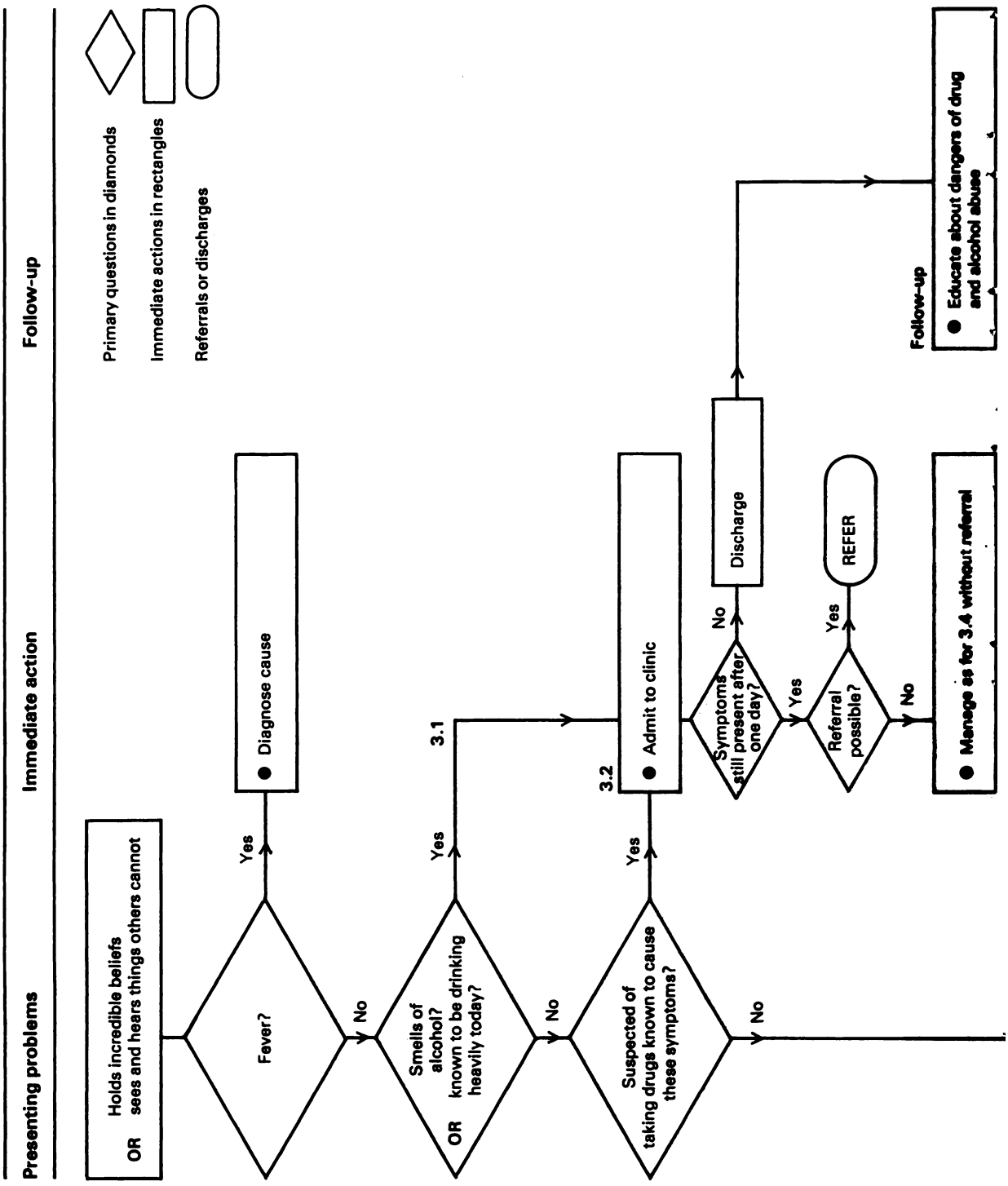
Care has been taken to define the presenting problems in Table I in terms which are unambiguous and can be translated into a wide variety of languages with minimum risk of distortion. In summary, these categories are behaviourly determined, atheoretical, and pragmatic, and form part of a system that is problem-oriented.

Defining and naming the categories

Initially the categories were simply designated by numbers, but we thought that this might lead to confusion when training health workers to use the charts. We therefore looked for a name for each category—some general characteristic that could be of practical value to the users of the system.

The first two categories—'Violence to others' and 'Violence to self'— were straightforward, and giving them priority seemed indisputable. The remaining six categories fall into two groups. In the first group

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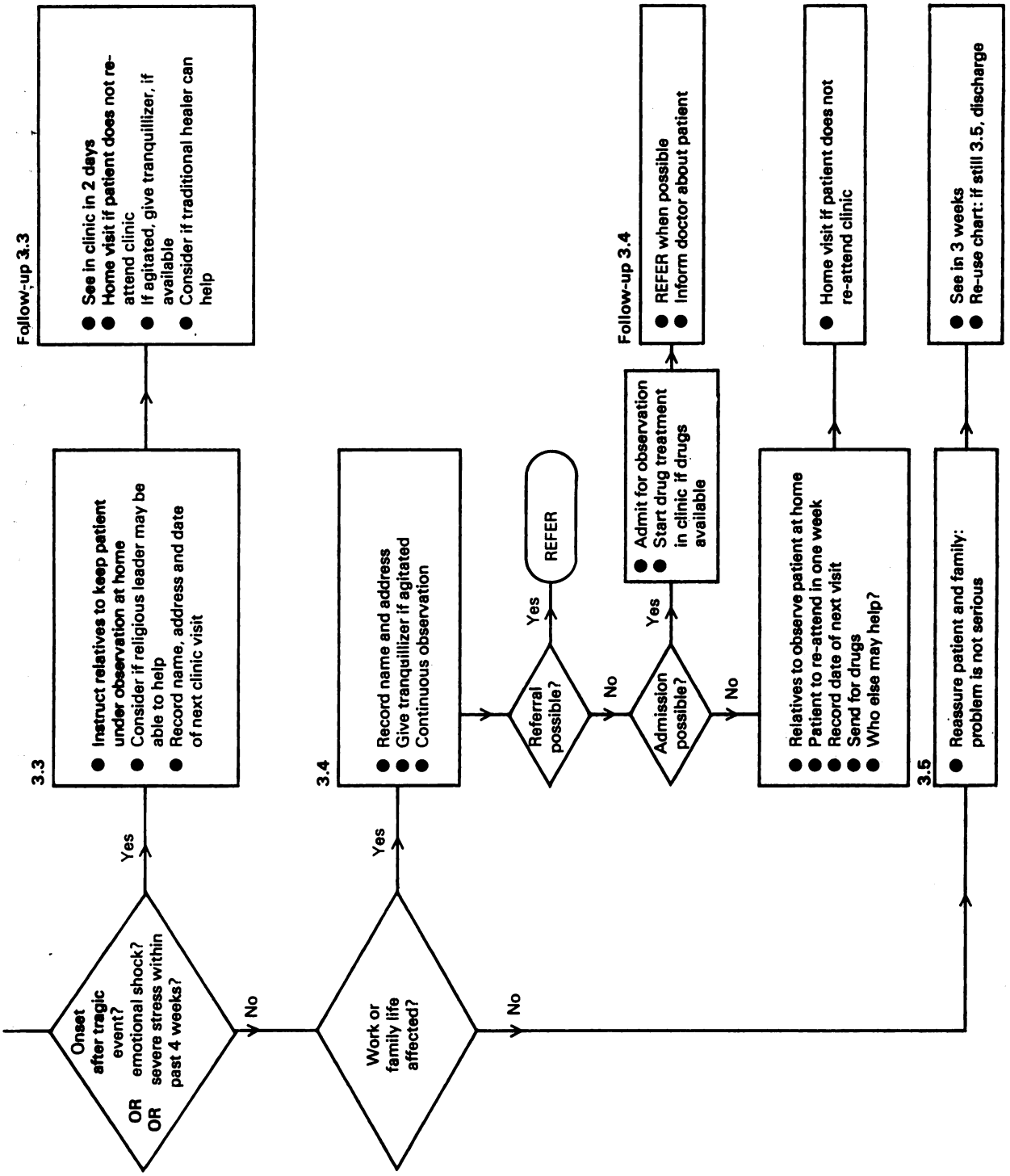


FIG. 1—Management of Category 3 patients (Delusional including hallucinations)

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(Categories 3, 4, 5, and 6) there is a relatively high probability of psychotic disorder. Categories 5 and 6 tend to contain patients whose presenting problems are less serious than those represented by Categories 3 and 4. Category 3—'Delusional (including hallucinations)'—was assigned its position in order to sort out as early as possible those cases which presented with reports of hallucinations or delusions. This is quite a well-defined group of patients who are universally regarded as suffering from a serious mental condition. Category 4—'Withdrawal'—was developed to select patients who provide minimal responses, or whose generally withdrawn behaviour suggests a serious condition. Categories 5 and 6 select cases presenting with abnormal speech and abnormal behaviour, excluding those cases already assigned.

We did not expect that every psychotic patient would be detected and assigned right away to one of the categories 1–6, nor that everyone assigned to these categories would have features of psychosis. The strategy we adopted was one of sensitivity in the initial categorizing step: we considered it acceptable, in order to identify as many serious cases as possible, to admit a number of false positives initially, and rely on the subsequent algorithm to differentiate between these and serious cases appropriate for referral.

In the remaining categories, 7 and 8, the likelihood of a psychotic disorder is less than in Categories 1–6. Category 7—'Anxiousness'—was defined by the presence of certain physical symptoms and signs which have, in various cultural settings, been associated with anxiety. Category 8 was designed to absorb any remaining cases and covers a range of presentations, including sadness, hopelessness, loss of interest, guilt, specific worries, sleep disturbances, or a pattern of vague general symptoms for which no organic cause can be found. Continuation of field trials in different cultural settings is needed for further confirmation of the adequacy of this category.

In selecting the names for categories we decided to avoid specific psychiatric terms, which could be misleading to a specialist, in favour of language more easily comprehensible to non-specialists. Although Category 8 was called 'Depression', the more serious problems of depression should already have been assigned to other categories, and 8 should deal mainly with less severe depression. The same principles of nomenclature for categories should be adhered to in translation to other languages: the usual psychiatric terms should be avoided in favour of closely related but distinct vernacular terms.

Sequence of elimination

Each chart has its own rationale and basic strategy, and we found that once the the order of items within each chart was fixed it could not be altered without considering the entire set of charts. Changes within the system during use should therefore be made only by someone who is expert in the technique used here, and familiar with the charts.

In addition there are certain general principles used in the development of all the charts. The most important principles are that relevant physical conditions or causes are excluded as early as possible, and that more serious conditions are detected before distinguishing between less serious ones.

The organization of the Category 3 chart (Delusions including hallucinations), shown in Fig. 1 illustrates the application of these principles. Physical causes of the presenting problems, namely fever, alcohol, and drugs, are considered first, and may lead to a referral. Other cases which are not serious enough to indicate referral are then sifted out. In the more serious of these the presenting behaviour is reactive, or due to recent severe stress or emotional shock. The basic management indicated here is home care and observation, with follow-up by a health worker. Of those cases remaining, those in which the patient's behaviour interferes with work or family life require referral. The others represent people with some insight or adequate control who have harmless fantasies which do not affect work or family life: in general these disturbances are minor and well tolerated. Management is simply to provide reassurance for both family and patient, with adequate follow-up visits.

According to our general principles, the less serious cases should have been sifted out first, to leave only those serious enough to need immediate symptomatic treatment and referral if possible: however, the last two managements on Chart 3 have been reversed to avoid double negatives which would have increased the chance of error in the interpretation of observations.

A somewhat contrasting example of the general method may be found in the chart for Category 8 cases (Depression), shown in Fig. 2. First to be sorted out are cases in which there are thoughts of self-destruction. The next group to be identified are those in which the presenting problems are secondary to recent reactive events with emotional trauma.

It is assumed that any somatic complaints have already been investigated: specific physical conditions need to be eliminated only if there is evidence of hallucinations or delusions. If delusions or hallucinations had been identified at the outset, then the patient would have been placed in Category 3. However, it may have happened that the presenting circumstances did not initially point to Category 3 so that the case fell into Category 8 instead: the inclusion of delusions and

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hallucinations in this chart is an example of the fail-safe mechanisms built into the system.

Once delusions and hallucinations have been excluded, there remain three groups of patients. First, there is a group whose symptoms are due to problems in their family, community, or at work: their management differs from those patients whose symptoms are not due to any known precipitating factors. The next group of patients are those whose symptoms have persisted for over four weeks and interfere with regular tasks at home or work. With these selected out, there finally remains a group of non-specific cases of recent onset or with mild symptoms.

Cross-cultural considerations

There is a vast amount of cross-cultural literature available, but much of it relates to societies considerably more isolated and distinctive than the populations for which this method was designed. We directed our attention to populations with access to basic medical care, attended by health workers who have training and experience prior to undertaking this work.

Devising a system which would be acceptable in a wide variety of cultures did impose certain constraints. Any suggestion that a health worker assess 'mood', for example, has been by-passed, as have attempts to detect 'feelings' such as 'tension' or 'uneasiness'. The decisions that a health worker is required to make in our system are specific and based, as far as possible, on observed behaviour. Preliminary work indicates a high degree of inter-observer reliability especially within the same society.

One particular concept which led to considerable concern was that of 'anxiety'. We felt it necessary to distinguish between milder anxiety states and cases in which anxiety might manifest with depression. The problem was that terms and other figures of speech used to indicate anxiety feelings vary widely between different groups. Anxiety is often designated by inappropriate somatic descriptions, e.g. 'heart pain' or 'head pain': the best way to detect anxiety which presents like this is to look for physical symptoms for which no organic cause can be found. Cases in which anxiety presents in other ways require different managements: these we allowed for.

Cross-cultural considerations have also produced some minor constraints on the observations specified in the charts in order to avoid creating misunderstandings. Local workers must develop their own sensitivity in such areas, whether in reference to personal habits, family tragedies, or whatever else needs an indirect approach.

Problem management codes

A management code has been developed in which the first number indicates the category in which the patient has been placed and the second number indicates the set of observations which are used to select a specific management. For example, 3.4 represents the management of a patient with delusions or hallucinations for which no organic cause can be detected by the health worker and who has no reported history of recent stress or emotional trauma, but whose work or family life is affected by the presenting problems.

Each code therefore provides:

1. A rapid way to identify the appropriate management.
2. Information about the presenting problem and the observations made each time the patient was seen.
3. A possible method of evaluating the outcome of treatment in terms of a change of code.
4. An efficient and unambiguous means of communication between different health workers within the health service.

Specifying the managements

Management strategies conforming to national policy must be adapted to local skills, local resources, local constraints, and local customs. Management options will also depend upon satisfactory evidence of effectiveness and acceptability of management proposed. Each management protocol outlines:

1. What to do when normal resources and skills are available.
2. What to do when there is no transport or drugs are not available.
3. What to do when a patient who should re-attend does not do so.

These are real constraints which operate at a primary-care level in developing countries. The management protocols also provide minimum indications on follow-up:

1. Which patients to follow-up.
2. When and where there is to be a follow-up.
3. What to look for and ask for at the follow-up.
4. What to do if the patient is better, the same, or worse.
5. What to do if the patient fails to re-attend.

These management outlines may be amplified or changed according to local conditions. The responsibility for ensuring appropriate management rests with local workers and with the Ministries of Health who wish to use such a system. These management strategies are currently being tested and adapted by local staff in various countries and evaluation studies are being undertaken.

The development of management strategies based upon a consensus of expert opinion does much to

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standardize the quality of care. It also ensures appropriate referral and utilization of higher-level health workers and makes for safe management decisions. The system can also be used to help to evaluate the quality of primary mental health care.

Training Programme

A training programme has been developed to teach people how to adapt and use this new method of deciding on management (Essex and Gosling, 1982). The programme outlines the basic clinical skills which must be acquired before the method can be used. The rules for use of the flow charts are as follows:

1. Do not use the charts before the skills of history-taking and physical examination have been acquired.
2. Do not use the charts without proper instruction in their use.
3. Only use the flow charts to identify management of present mental health problems, never to identify past mental problems.
4. Do not use the charts for anyone below 10 years of age.
5. Use the charts before drug treatment is given, if possible.
6. Allow patients to present problems without any interruption and allow them to talk for as long as they want.
7. List presenting problems as you listen, separating those presented by the patient from those presented by others.
8. Do not ask any questions until patient has finished talking.
9. Use Table I to select the first appropriate problem category and refer to the appropriate flow chart.
10. When information required by the chart cannot be obtained, assume that the answer is No.
11. When you are not sure of an observation assume that the answer is No.
12. Any conclusion is to be reconsidered immediately if more information becomes available.

In the training programme, many case studies describe patients with several presenting problems: the student must first learn to select the first appropriate category. There are also many simulation exercises, and 63 cases of varying degrees of complexity are examined in detail. These refer to actual patients seen in six countries during the WHO Collaborative Study on Extending Mental Health Care.

Conclusions

What has been presented here is a method for identification and management of mental health problems in developing countries. Its success will be measured by the extent to which it enables trained health personnel to assign appropriate, efficient, and acceptable managements to people with a wide range of disturbed behaviours.

It must be stressed that this work has been developed to fill a vacuum, and is intended to be used where no other programme is available. Where alternative methods of training do exist, comparative evaluation studies must be done to identify the most effective method of training. Such a comparative evaluation would also indicate if this new problem-oriented method could supplement existing programmes.

Evaluation studies have been done on the reliability, accuracy and acceptability of this algorithmic method. In some of the studies, the code numbers were replaced by diagnostic labels. Initial evaluation in India showed agreement in 28 out of 30 cases between nurses using the flow charts and the consultant psychiatrist's proposed management (Essex, 1978). Similar evaluation studies in Lesotho showed a 76 per cent agreement in 60 cases (Wankiiri, 1980). A study was undertaken recently in Cairo to measure the repeatability of categorization, using two or three observers for each patient. The students, who had no previous medical training, were given a minimal six-hour course of instruction, and then two or three students each independently categorized new patients being seen by a psychiatrist in the out-patient clinic. There was agreement between the observers on initial categorization in 72 per cent of 272 cases seen. Preliminary field tests in Uganda have confirmed that the method is highly acceptable to the medical assistants, who quickly grasp the concept of flow charts and are enthusiastic about their use (Egdell, 1981: personal communication).

The evaluation studies that have already been done confirm that the method is acceptable and efficient and gives results with a high degree of repeatabililty. However, its success will not depend upon more studies of this kind, but on whether or not the medical establishment will accept and promote a system for mental health training in developing countries which is radically different to everything that has preceded it.

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