

# Health education Interventions in Developing Countries: A Methodological Review of Published Articles

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Some 67 journal articles that described and evaluated health education programmes in developing countries were read by two independent reviewers who examined the methodology used in the studies. Of the articles 47% provided a sufficiently detailed description of the educational intervention to allow replication and 40% described the educational level of the intended audience. Only 21% were controlled studies employing sample sizes greater than 60 individuals or two clusters, although six studies used randomized or quasi-randomized designs. Of the studies 33% looked at changes in health status while another 33% used observable changes in health behaviour as an endpoint. There was good agreement between the reviewers on whether these characteristics were present.

Only three of the articles contained all four methodological attributes described above. The results of these articles suggests that successful health education depends on using a few messages, of proven benefit, repeatedly, and in many forums.

It is important to improve the methodological quality of health education research. This can be done by using controlled, preferably randomized, designs, ensuring adequate sample sizes, examining only objective changes in behaviour or, better yet, changes in morbidity or mortality. Research reports should describe in detail the educational intervention employed and the target audience.

The World Health Assembly at Alma Ata listed health education as the first of eight essential activities needed for successful primary health care programmes in developing countries.<sup>1</sup> Indeed it is hard to imagine a programme to control diarrhoeal diseases, immunize children, promote good nutrition, or stop the spread of AIDS that does not involve some form of education. Furthermore, health education can also be seen as part of the general process of development whereby people take control over their lives by gaining the knowledge and skill necessary to prevent or control disease.

Because the success of primary health care programmes may well depend on health education it is important to know what has already been learnt about actually carrying out health education in developing countries. Answering this question requires an assessment of the methodological quality of the relevant literature. This review was undertaken to examine the methodology that has been employed and to use sound studies to gauge what is reliably known about health education in Third World countries.

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## METHODS

A search of the English language literature between January 1966 and July 1987 was conducted using computerized databases (Medline, Popline, and ERIC) previous review articles<sup>1-8</sup> and the author's own files. In addition two speciality journals, the *International Quarterly of Community Health Education* and *Hypertension* (formerly the *International Journal of Health Education*) were searched manually.

Articles were included for review if they dealt predominantly with a health education intervention in a developing country and if an evaluation of the educational manoeuvre was carried out. This meant that articles that just described an educational intervention or discussed the theory of health education were specifically excluded.

Health education has been defined as that which "... concerns all those experiences of an individual, group, or community that influences beliefs, attitudes and behaviour with respect to health as well as the processes and efforts of producing change when that change is necessary for optimal health."<sup>2</sup> It should be noted

either this, nor any other articles for inclusion in the review to the authors and included in the review (60 titles.)

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neither this, nor any other, definition was used to select articles for inclusion in this review. Rather, it was left up to the authors and indexers of the articles to decide what constituted health education. (Of the articles included in the review 66% had the word 'education' in their titles.)

The term 'developing country' was defined as any country in Africa, Latin America, the Caribbean, the south Pacific and Asia excluding the USSR, Japan, Taiwan, Israel, Korea, Singapore and Hong Kong.

Materials published in books or other non-journal documents such as government or foundation publications were excluded from the review. This was done to avoid any bias resulting from variable access to these sources. Access to articles published in journals was good. Only three articles cited in the sources used for the literature search could not be located.

Of the literature identified by the search 81 articles were judged as possibly meeting the above inclusion criteria and were read by two reviewers. The reviewers did not discuss the articles they read and were blinded to the name of the journal the article appeared in, the author's name and their affiliations. The reviewers completed a separate, precoded survey form for each article they read. Both reviewers felt that 67 articles dealt predominantly with a health education intervention and included an evaluation of it and the results reported below pertain to these.

The inter-observer reliability of each item on the form was assessed by using the Kappa statistic described by Fleiss.<sup>9</sup> Kappa reflects the agreement between two or more observers above what would be expected due to chance. Kappa values below 0.40, are usually considered to reflect poor inter-observer agreement, values between 0.40 and 0.70 reflect good agreement and values above 0.70 reflect excellent agreement.<sup>10</sup> The percentage of articles displaying a certain attribute was calculated as an average of the proportions judged to have the characteristic by each reviewer.

Prior to beginning the review process it was decided that reliable information about health education could be obtained from articles that included:

- (1) A description of the educational manoeuvre sufficiently detailed to allow replication by other health workers.
- (2) A description of the target audience that would allow others to judge whether the population they deal with resembles the population studied.
- (3) A simple controlled study design with a sample size of more than 60 individuals or more than two 'clusters' (villages or similar groups used as experimental units). (for a discussion of why 'one to one' comparisons are not very useful see Blum and Feechum).<sup>11</sup>

(4) The outcome of interest be either a change in observable health related behaviour (eg increase in the use of services) or in health status.

## RESULTS

The computerized literature searches identified 532 articles dealing with health education in developing countries. Of these only 57 (10.8%) described and evaluated actual attempts at health education and were included in the review. The remaining 475 articles identified by the computer either described, but did not evaluate, an educational manoeuvre or dealt with the theory of health education.

Of the 67 articles<sup>12-80</sup> included in the review ten were identified from review articles, the two speciality journals, and the author's files.

### Description of Intervention and Audience

An adequate description of the educational manoeuvre evaluated would seem to be essential if readers are to gain from the experience of the authors. Of the 67 articles reviewed 47% had provided a description sufficiently detailed to allow replication of the educational process (kappa = 0.55).

Of the articles reviewed 40% described the educational level of the target population (kappa = 0.62). Similarly half the articles described the age and gender of the audience.

### Study Design and Outcomes Examined

Less than half of the articles (45%) used a control group and only 21% were controlled studies with sample sizes greater than 'two' 'clusters' or 60 individuals (kappa = 0.58). On the other hand four articles<sup>21,41,72,80</sup> described truly randomized studies and two others utilized quasi-randomized designs.<sup>50,76</sup>

A large number of the studies reviewed examined important end-points, such as changes in health behaviour or in health status. Fully 33% of the articles attempted to measure changes in health status and another third measured changes in observable health related behaviours (kappa = 0.68).

The methodological characteristics that were felt to be desirable prior to undertaking the review were identified reliably. There was good agreement between the reviewers with kappa statistics ranging from 0.55 to 0.72. These desirable attributes, taken individually were found in between 21% and 67% of the articles. As can be seen in Table 1 the only characteristic that was found more often was the claim of positive results for the educational intervention.

### Studies Exhibiting Desirable Methodological Characteristics

Only three of the 67 articles reviewed contained the positive methodological attributes described above.

TABLE 1 Characteristics of articles reviewed

Characteristic	Percentage of articles displaying characteristic*	Inter-observer Reliability Kappa**
Study based on explicit theory	12%	0.58
Adequate† description of how educational strategy was adapted to local conditions	11%	0.48
Example given of materials or education process employed	33%	0.65
Adequate† description of resources required to carry out educational programme	11%	0.40
Measured outcome before and after the intervention	47%	0.64
Period between education and outcome more than one year	20%‡	0.54
Evidence of community participation in design of programme, goals or outcome measures	9%	0.45
Article claimed to show positive results for intervention evaluated	87%	0.45
Included discussion of possible biases or caveats	44%	0.47
Included p-values or confidence intervals	53%	0.79
Employed some form of modelling such as regression	10%	0.53

\* Average of two reviewers

\*\* See text for description of Kappa

† 'Adequate' was defined as 'sufficiently detailed to allow replication by the reader'

‡ 35% did not indicate the time period.

One of these described a randomized community study from Bangladesh<sup>21</sup> which attempted to decrease diarrhoeal incidence by getting families to wash their hands before preparing food, prevent open defaecation by children in the family compound, and ensure proper disposal of garbage and faeces. The absence of these behaviours had been shown in a preceding study to be the best predictors of diarrhoeal morbidity.

Volunteers living in each experimental village and a trainer assigned to three or four villages conducted small group discussions for only women or only children, larger demonstrations for mixed audiences, and community-wide planning and action meetings. The intensive training phase lasted for eight weeks and then volunteers continued reinforcing the educational message in the community using new stories and games. For the six-month period following the educational intervention diarrhoeal incidence was 26% lower (95% CI = 18–33%) in the experimental villages (n=26) than the control villages (n=25) even though it had been nearly identical prior to the programme.

The second methodologically sound study was one which randomized pregnant women attending a prenatal clinic to receive, or not to receive, health education designed to promote breastfeeding.<sup>41</sup> Women, in groups of three to six attended two half-hour sessions where an experienced midwife led discussions on the advantages of breastfeeding. Many photographs were used and pamphlets were distributed.

A research worker, blinded as to whether or not a woman had received the health education, interviewed the mother at the clinic after delivery. Another sample of women, who had also been randomized, were interviewed in their homes, on average ten weeks after delivery.

It was found that among women interviewed at the clinic those who had received education knew significantly more about breastfeeding. For those interviewed at home there was still a difference in the knowledge between the experimental and control group but the difference was small. There was no difference in the mean number of weeks at which formula feeds were introduced between the group receiving education (mean = 4.71)(95% CI = 1.3–8.1) and the women who had not received any education (mean = 5.22)(95% CI = 0.3–10.1).

The third of the three articles was about a quasi-randomized study from Lebanon<sup>50</sup> which examined the effects of individual health education on the uptake of contraception. Women who were admitted to an obstetrics ward were assigned to the control or experimental group according to their room number. Mothers in the experimental group were visited by a trained educator for 20 minutes on their second postpartum day. They were asked about their knowledge, attitudes and practice regarding family planning and then a brief discussion took place with a follow-up visit the next day. Of the women in the educational group

33.8% (95% CI = 27.6–40.0) used family planning clinic within nine weeks of delivery, compared with only 18% (95% CI = 12.5–23.5) in the control group. Contraception.

These last two studies are methodologically sound manoeuvre that was performed, therefore difficult to tell which strategy that was being used by the individual.

## DISCUSSION

Given the paucity of methodologically rigorous studies it is difficult to reach any firm conclusions on the effectiveness of health education. In the few studies conducted it appears that health education sometimes lead to changes in behaviour, but sometimes status although there remain some scepticism.

It is also difficult to conclude whether any particular educational strategy is better than any other. From the few methodologically rigorous studies that concentrating on a few specific behaviours, frequently, in a number of different settings, the likelihood of success.

It might be argued that community research in developing countries cannot be judged by the methodological standards used in this review. That there were six studies that used quasi-randomized designs or randomized designs, but rigorous methods can, in fact, be used in these settings. The methodological quality felt to be desirable prior to the review. Taken individually, community articles examined. This is not to say that they themselves thought these were important.

There are very good methodological quality of health education in developing countries. The methodological quality of health education in developing countries constitute as little budget.<sup>75</sup> One of the few ways may be to provide planning officials with convincing evidence of the effectiveness of health education. Secondly, the absence of rigorous studies where it can generate very misleading results. There was a substantial change from 'before' to 'after'. W

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33.8% (95% CI = 27.6–40%) returned to a post-partum family planning clinic and started using contraception within nine weeks of delivery. In the control group only 18% (95% CI = 15.4–20.5%) accepted contraception.

These last two studies evaluated a health education manoeuvre that was performed by one person. It was, therefore difficult to tell whether it was an educational strategy that was being evaluated or merely an individual.

## DISCUSSION

Given the paucity of methodologically sound studies it is difficult to reach any firm conclusions about the effectiveness of health education. From the few well conducted studies it appears that health education can sometimes lead to changes in behaviour and in health status although there remains room for legitimate scepticism.

It is also difficult to conclude from the available data whether any particular educational strategy is superior to any other. From the three articles that included methodologically rigorous evaluations it would appear that concentrating on a few messages, repeated frequently, in a number of different forums increased the likelihood of success.

It might be argued that conducting health education research in developing countries is difficult and should not be judged by the moderately rigorous methodological standards used in this review. However, the fact that there were six studies that employed randomized or quasi-randomized designs does indicate that rigorous methods can, in fact, be utilized in Third World settings. The methodological characteristics which were felt to be desirable prior to beginning the review were, taken individually, commonly found among the articles examined. This indicates that the authors themselves thought these methodological attributes were important.

There are very good reasons for improving the methodological quality of studies evaluating health education in developing countries. Firstly, funds available for health education are meagre and in some countries constitute as little as 0.01% of the health budget.<sup>25</sup> One of the few ways of getting more money may be to provide planners and other government officials with convincing studies demonstrating the effectiveness of health education.

Secondly, the absence of adequate control groups can generate very misleading results. In the two randomized studies where it was possible to measure it, there was a substantial change in the control group from 'before' to 'after'. Whether due to seasonal varia-

tion, the 'Hawthorn Effect' (ie the effect of being watched or unusual attention being paid), or some other reason, the control groups in these two studies experienced dramatic improvements that were as large as the experimental effect.

Experience in other areas of health care also indicates that uncontrolled or poorly controlled trials routinely exaggerate the perceived effectiveness of an intervention.<sup>12</sup> Thus non-rigorous studies may give rise to falsely high expectations which will interfere with the planning of primary health care programmes.

*Possible Limitations of the Review*

The results of this review could have been affected by the following factors and biases:

*Publication bias*

Educators who evaluate their programmes and find that they haven't worked are less likely to publish their results and journal editors are less likely to accept for publication such 'null' results. This publication bias favours positive results<sup>13</sup> and may explain the high proportion of studies that claimed health education had a beneficial effect.

*Journal restrictions*

It is possible that inadequacies in the articles reviewed had more to do with journal editorial policy and space restrictions than with the quality of the research performed. However, no simple (linear) relationship existed between the length of an article in words and the adequacy of the education process or the description of the demographic characteristics of the target population ( $R = 0.06$  and  $0.10$  respectively).

*Recommendations*

From the little evidence available it appears that health education can be successful in improving health if: The number of messages are few. They are of proven benefit to the individual or community. They are repeated frequently. As many different forums as possible are used to convey the messages.

While these recommendations may appear either obvious or simplistic, successful health education programmes will have to pay attention to these basic factors regardless of their philosophical or theoretical orientation.

Until now involvement of the community in health education efforts has been rare. The use of more participatory techniques has been advocated many times before<sup>1,2,6,8</sup> and should be part of future educational interventions.

The quality of health education research can be

improved if research designs and the resulting articles include the following:

#### Detailed description of educational intervention

A description of the educational manoeuvre sufficiently detailed so that other health educators could replicate it (or decide whether it is replicable) is essential. Such a description would include how the intervention was developed and adapted to local conditions, the theory, if any, upon which it was based, and the length of time, resources, and personnel needed to carry it out.

#### Description of the intended audience

This is also an essential part of any research report and would include the size of the audience, its level of education, age and socioeconomic characteristics (eg access to radio and newspapers).

#### Controlled study design and adequate sample size

Controlled studies are both necessary and feasible in most situations. (Studies examining the usefulness of mass media may be difficult to control but rigorous time-series designs should be employed). Randomized trials, including studies which randomized communities, have been successfully carried out in Third World settings and should become the norm.

Most health education interventions in developing countries are preventive or promotive in nature and hence, the intended audience is very large. Thus it should be easy to obtain an adequate number of subjects or communities for any proposed study.

#### Important and objectively verifiable outcomes

Changes in attitudes or knowledge are simply not sufficient as outcome measures. Rather, studies should examine objectively verifiable changes in behaviour (eg increased use of immunization services) where those behaviours are of proven effectiveness. Even better is the use of changes in health status, particularly morbidity and mortality, as outcome measures.

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## A Methodological Review of Therapeutic Trials Employing Cluster Randomization, 1979-1989

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Donner A (Department of Epidemiology and Biostatistics, University of Western Ontario, London, Ontario, Canada) and Stephen K (Department of Epidemiology and Biostatistics, University of Western Ontario, London, Ontario, Canada). *International Journal of Epidemiology* 1989; 18: 1-10.

A methodological review is presented of 100 randomized trials of therapeutic interventions. The review is based on information supplied on six methodological issues associated with cluster randomization: sample size requirements and response rates observed in their trials as

An increasingly common feature of intervention trials is the randomization of clusters rather than individuals in the treatment and control groups. Examples occur in educational strategies, where one or more classrooms are assigned to different teaching methods; in the evaluation of health care strategies, where one or more medical practices or experimental intervention or control groups are assigned to different treatment units; and in industrial settings, where one or more plants or departments are assigned to different treatment units. Cluster randomization is often preferred to individual randomization because it is more efficient than designs which require randomization of individuals into treatment groups. However, there are many practical reasons for preferring cluster randomization, including the need to reduce the number of treatment units, the political and administrative difficulties of randomizing individuals, to avoid treatment group contamination, to ensure that the treatment will be eventually implemented, and to take advantage of the natural advantages in terms of external validity of cluster randomization. A characteristic feature of cluster randomization is that the natural variability within clusters exceeds the variability between clusters. The larger the ratio between

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