
AN INVESTIGATION ON THE EFFECTIVENESS OF DISTANCE EDUCATION FOR POST BASIC TRAINING OF ASSISTANT MEDICAL PRACTITIONERS (AMPs) IN SRI LANKA

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Abstract

The study examines the use of distance teaching methods to provide post-basic training for Assistant Medical Practitioners (AMPs) in Sri Lanka and was based on four learning modules on priority topics in Medicine, Surgery, Paediatrics and Gynaecology & Obstetrics which had been prepared in a format suitable for distance learning.

Of the 22 districts in Sri Lanka, three districts were chosen as the study areas. Ten AMPs from each of the three districts were randomly selected for this pilot study. One group was provided with learning modules only, the other two groups were given the learning modules, together with clinical training at a teaching hospital (TH) for one group and at a non-teaching hospital (NTH) for the other. This sample population was evaluated by means of a pre-test and a post-test during the study.

The study revealed that (a) the base level of knowledge of the AMPs was lower than expected, (b) the control group which was provided with only the learning modules showed

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significant improvement, (c) disciplines like Gynaecology & Obstetrics needed some degree of clinical input, highlighting the importance of at least a short exposure of clinical teaching in some disciplines, and (d) the teaching hospital group performed better than the non-teaching hospital group emphasising the importance of the infrastructure available in a teaching hospital setting for clinical teaching.

INTRODUCTION

Assistant Medical Practitioners (AMPs) are middle level health professionals who are directly involved in the provision of primary health care in Sri Lanka. At present there are about 1250 AMPs working at various government hospitals, especially in rural areas. The AMP training programme began at the Faculty of Medicine, Colombo in 1976. Additional centres have subsequently been established in Peradeniya, Jaffna and Kalutara. After completion of the 2 1/2 years basic training, the AMPs do not have any opportunity to enrol on a continuing education programme. A survey carried out on AMPs revealed that the lack of such a programme and the lack of a career structure had led to frustration and inefficiency in the delivery of health care; 96% were dissatisfied because of the lack of opportunity for future professional achievements and 84% were dissatisfied because of the unavailability of any continuing education programme even on the basis of self education (Weerakoon and Jiffry, 1989). The major obstacle to the conventional form of a post basic training programme was the requirement to affiliate the AMPs to a training institute away from their present working stations and home towns. Therefore, a decision was made to implement a pilot study to evaluate the practicality of using the distance education format for the continuing education of AMPs.

Distance education is an educational process where teacher-learner interaction mainly occurs through instructional media and the learner is necessarily distanced from the teacher by space and time. One of the tremendous advantages of this system of education over the conventional form is that the learners can be stationed at their own places of work. Furthermore, they can study at their own pace and also chose the topics according to their own priority and liking. However, distance education had not been tried out for clinically oriented disciplines anywhere in the world except for the training of nurses in Canada (Kerr, 1988). The distance

educational format usually has several possible components including face to face teaching, printed materials and electronic media. As the production of clinically oriented educational material in the form of electronic media proved to be too costly only face to face teaching sessions and printed media have been utilised in this investigation. It was envisaged that the best form of face to face component relevant to this study would be the clinical demonstration of patients. However, it was not certain whether a Teaching Hospital (with teaching facilities and service functions) or a Base Hospital (only service functions) should be used to carry out the clinical teaching to yield the maximum benefits. Furthermore, it was also intended to test the extent to which the face to face component would help in the learning process of the AMPs at this level. Therefore, one group of AMPs was chosen as the control group and provided only with the learning modules. The other groups were exposed to the modules as well as clinical teaching.

The aims of this study were to evaluate;

1. the usefulness of distance learning as a mode of continuing education for AMPs.
2. the extent to which face to face teaching in the form of clinical demonstration of patients could complement and supplement distance learning.
3. which type of hospital (base or teaching) was more suitable for face to face teaching.

MATERIALS AND METHODS

Four learning modules for the distance teaching format had been prepared according to distance education principles by a course team consisting of authors (Medical Officers teaching the AMPs), subject specialists

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(Consultants) and academics, over a period of 10 months. The topics were selected according to the findings of a previous survey (Weerakoon and Jiffry, 1986) carried out on the AMPs to ascertain their deficiencies and learning requirements. These topics included Diabetes Mellitus (Medicine), Acute Abdomen (Surgery), Neonatal Emergencies (Paediatrics) and Post Partum Haemorrhage (Gynaecology & Obstetrics).

The Puttalam, Kalutara and Gampaha districts (geographically demarcated administrative areas in Sri Lanka) were chosen as being the most feasible study areas, due to their close proximity to the study centre as well as the availability of sufficient number of AMPs in service. Ten AMPs from each district were selected on a random basis. The AMPs of Gampaha district were provided with the study modules only and this group was considered as the control group (CG). The Kalutara and Puttalam groups were assigned to follow weekly clinical sessions at the Panadura Base Hospital (a teaching hospital for AMPs, abbreviated as TH) and at the Chilaw Base Hospital (Non-Teaching Hospital - NTH) respectively, in addition to being provided with learning modules.

All three groups were evaluated at a pre-test before the commencement of the course. Thereafter, they were given the study modules, self assessment forms and other instructions regarding the rules of the project. They were expected to learn the modules while working at their stations and to attend the clinical demonstrations at the hospitals assigned (Kalutara & Puttalam groups); the Gampaha group (control group - CG) was asked to confine themselves only to the modules and any other material they came across. They were clearly instructed not to attend any organised clinical teaching during this period. All three groups were given about 10 months to complete the four modules. During this period they were requested not to discuss the contents of the modules with other participants if they met. The investigators paid two monitoring visits to the hospitals where the clinical

teaching was being conducted to ascertain the progress of the project. In addition a co-ordinator was also appointed to each district to attend to the immediate needs of the learners.

The training programme was free of charge to the trainees. The entire study was funded by World Health Organisation. At the end of approximately ten months the post-test was conducted in Colombo for all three groups together. The pre and post test marks were compared statistically using paired t test.

RESULTS

Of the 30 trainees who had been selected to take part in this project, only 29 reported for the orientation programme and thereafter for the pre-test. Thus the sample for the study consisted of 29 trainees, the missing trainee being from the Puttalam district. However, at the end of the project only 25 trainees were able to take part in the post test. From the Puttalam district (NTH) all 9 trainees sat for both pre and post tests, whereas from Kalutara (TH) and Gampaha (CC) districts, of the original 10 participants only 7 and 9 participants respectively sat for the pre-test and participated in the post-test. In the analysis of results, only the marks of those who sat for the post-tests were used.

Marking of MCQs

The MCQs were marked in the following manner. For each correct response a +1 score and for each wrong response a -1 score was allocated. A zero score was allocated to responses that had not been attempted.

A data base programme was developed to analyse the responses on dBase III+. From this data base programme it was possible to group the marks of the trainees of each district and classify them according to the subjects. Thereafter, for each question the total number of +1 marks and -1 marks obtained was calculated separately.

For further analysis of the MCQ marks, especially in view of the fact that some authorities do not favour carrying forward of the negative marks (Ward, 1981), two methods were adopted. These are described below.

Method A

In this method of analysis, all the positive and negative marks were added together, as in the case of a conventional marking of an MCQ paper.

Method B

For each MCQ there are five responses. If a student gets all the five responses correct, he/she could score a maximum of 5 marks. If there are 10 students in a group the total marks would be 50. The actual correct responses (+1) obtained for each MCQ by each group has been calculated and expressed as a percentage of the maximum possible score. For example, if for Question1 the total number of correct responses obtained by 10 trainees was 30 marks, since there could be a maximum of 50 marks, the percentage would be 60%. In this method of analysis the negative marks were not taken into account.

In both methods the MCQ marks were presented separately according to the groups and disciplines.

MCQ Marks

The marks of the MCQs of all the trainees who sat for the pre and post tests calculated according to method A are summarised in Table I.

DISTRICT	TEST	NO. OF TRAINEES	SURGERY %	PAEDIATRICS %	MEDICINE %	GYN/OBS %
PUTTALAM (NTH)	PRE	09	20.74 ± 14.03	27.78 ± 10.4	28.44 ± 18.0	21.32 ± 5.6
	POST	09	27.70 ± 16.6	43.12 ± 13.4	58.00 ± 24.8	40.44 ± 10.0
KALUTARA (TH)	PRE	10	26.93 ± 11.7	35.80 ± 10.4	36.40 ± 12.6	29.20 ± 14.0
	POST	07	44.00 ± 10.4	64.00 ± 12.4	72.58 ± 9.2	46.84 ± 10.8
GAMPAHA (CG)	PRE	10	21.87 ± 10.4	25.40 ± 13.0	40.00 ± 9.4	28.40 ± 23.6
	POST	09	41.48 ± 12.4	42.22 ± 16.8	64.44 ± 15.6	41.32 ± 7.2

Table I - MEQ marks calculated according to method "A"

In Table II, the MCQ marks of all the trainees who presented themselves for the post-tests are compared with their performance at the pre-test (The marks of all those who could not sit for the post-test have been excluded from this comparison).

The MCQ marks of all the groups for all the subjects at the pre-test were found to be below 40% (Table II). There was an overall improvement in the performance at the post-test. However, a score of more than 50% was achieved by all three groups only in Medicine. The Kalutara group (TH) also achieved more than 50% in Paediatrics.

DISTRICT	TEST	NO. OF TRAINEES WHO SAT FOR BOTH TESTS	SURGERY %	LEVEL OF SIGNIFICANCE P	PAEDIATRICS %	LEVEL OF SIGNIFICANCE P	MEDICINE %	LEVEL OF SIGNIFICANCE P	GYN/JOBS %	LEVEL OF SIGNIFICANCE P
PUTTLAM (NTH)	PRE	09	20.74 ± 14.3	P ≥ 0.05	27.78 ± 10.4	0.02 > P > 0.01	28.44 ± 18.0	0.01 > P > 0.005	21.32 ± 5.6	0.005 > P > 0.001
	POST		27.70 ± 16.6		43.12 ± 13.4		58.00 ± 24.8		40.44 ± 10.0	
KALUTARA (TH)	PRE	07	30.09 ± 9.5	0.05 > P > 0.03	36.86 ± 10.6	0.01 > P > 0.005	37.72 ± 9.8	0.01 > P > 0.005	28.00 ± 12.6	0.04 > P > 0.03
	POST		44.00 ± 10.4		64.00 ± 12.4		72.58 ± 9.2		46.84 ± 10.8	
GAMPAHA (CG)	PRE	09	23.56 ± 9.6	0.01 > P > 0.005	26.88 ± 12.8	0.02 > P > 0.01	40.00 ± 10.0	0.02 > P > 0.01	33.60 ± 16.0	0.06 > P > 0.05
	POST		41.48 ± 12.4		42.22 ± 16.8		64.44 ± 15.6		41.32 ± 7.2	

Table II - MCQ marks (MEAN ± SD) statistical significance

Marking of MEQs

MEQs were marked on a structured short answer system. The answer scripts of trainees from all three districts were mixed together to prevent any bias in marking.

The MEQ marks for each group were categorised according to the discipline. The difference in marks obtained at the pre and post tests for each discipline by each group was calculated.

MEQ Marks

Table III depicts the marks of all the trainees who sat for pre and post tests. The comparison of MEQ marks of those who sat for the post-test, together with their pre-test MEQ marks are shown in Table IV.

DISTRICT	TEST	NO. OF TRAINEES	SURGERY %	PAEDIATRICS %	MEDICINE %	GYN/OBS %
PUTTALAM (NTH)	PRE	09	41.00 ± 16.6	18.22 ± 21.5	35.11 ± 18.8	33.50 ± 13.0
	POST	09	50.27 ± 21.4	30.88 ± 24.5	50.56 ± 25.7	38.28 ± 10.9
KALUTARA (TH)	PRE	10	43.37 ± 18.1	21.69 ± 23.5	37.75 ± 19.4	32.19 ± 17.0
	POST	07	57.10 ± 15.0	39.30 ± 18.5	66.60 ± 17.5	46.60 ± 8.6
GAMPAHA (CG)	PRE	10	39.62 ± 17.0	9.19 ± 12.6	33.13 ± 18.9	37.63 ± 19.5
	POST	09	48.21 ± 20.7	53.00 ± 16.2	55.64 ± 21.0	38.79 ± 10.4

Table III - MEQ marks (mean ± sd) obtained by each group

DISTRICT	TEST	NO. OF TRAINEES WHO SAT FOR BOTH TESTS	SURGERY %	LEVEL OF SIGNIFICANCE P	PAEDIATRICS %	LEVEL OF SIGNIFICANCE P	MEDICINE %	LEVEL OF SIGNIFICANCE P	GYN/OBS %	LEVEL OF SIGNIFICANCE P
PUTTLAM (NTH)	PRE	09	41.00 ± 16.6	0.06 > P > 0.05	18.22 ± 21.5	P=0.05	35.11 ± 18.8	P=0.05	33.50 ± 13.0	0.06 > P > 0.05
	POST		50.22 ± 21.4		30.89 ± 24.5		50.56 ± 25.7		38.28 ± 10.9	
KALUTARA (TH)	PRE	07	44.40 ± 17.0	P=0.01	28.50 ± 25.0	P=0.05	38.20 ± 20.0	P=0.01	31.10 ± 17.6	P=0.02
	POST		57.10 ± 15.0		39.30 ± 18.5		66.60 ± 17.5		46.60 ± 8.6	
GAMPAHA (CG)	PRE	09	38.85 ± 16.7	P=0.01	6.57 ± 10.2	P=0.01	36.00 ± 18.0	0.01 > P > 0.001	38.42 ± 20.5	P ≥ 0.05
	POST		48.21 ± 20.7		53.00 ± 16.2		55.64 ± 20.9		38.78 ± 10.4	

Table IV - MEQ marks (mean ± sd) and statistical significance

In the case of MEQ, all the groups scored less than 45% in all disciplines at the pre-test. The Gampaha group (CG) scored especially low with a mean of 6.57% in Paediatrics. However, all the groups except the Gampaha group (CG) improved remarkably at the post-test, in Gynaecology & Obstetrics. In Medicine all three groups scored more than 50% at the post-test.

Generally, in all four subjects there has been an improvement in the performance of the MEQ.

DISCUSSION

Selection of topics

The topics representing the four clinical disciplines were chosen from a list of priority topics that had been identified at a previous workshop. For each of the four topics chosen from each discipline, the degree of clinical input needed was found to be variable. For example, in the case of the topic in Surgery "Acute Abdomen", supplementary clinical teaching was essential. The clinical skills expected from the trainees was the ability to recognise this condition and transfer the case to a hospital/ward with necessary facilities for urgent treatment at the appropriate time. On the other hand, topics like "Diabetes Mellitus" are common clinical entities that the AMPs would have noted almost daily in their routine clinical work. In addition because of such frequent exposure an AMP would have gained some experience to manage such cases. It was therefore expected that the trainees would be able to diagnose diabetes and manage this condition satisfactorily.

Face to face teaching by consultants

The consultants belonging to the Teaching (Panadura Hospital in Kalutara district) and Non-Teaching (Chilaw Hospital in Puttalam district) Hospitals played a significant role in this project. One difficulty that had been encountered was the transfer of some of the consultants during the period of implementation of this project. Thus the new consultants had to be sensitised and appraised of this project. Nevertheless, during the planning period of this project, such problems of transfers were considered and sufficient time had been allowed to offset such problems. However, it should be noted that since the project had to depend on several consultants for their clinical teaching, such transfers were inevitable. Furthermore it was essential that a sufficient time period be allowed to complete the clinical course.

The trainees were not transferred during the period of study since the Ministry of Health undertook to keep the trainees at their respective stations without transfers for the purpose of this study. However, one trainee from the Gampaha district (CG) had been transferred due to some unforeseen event. Nevertheless, she had been instructed to participate in this project since the number of trainees for each group is a critical factor. Accordingly, the trainee agreed to abide by the rules and follow the guidelines as set for the Gampaha group (CG).

Results of the pre-test

The pre-test results both in MCQ and MEQ revealed a low base level knowledge in all the disciplines (below 40% for MCQ and below 45% for MEQ) amongst all the trainees. These findings indicate the urgent need for a continuing education programme to upgrade the knowledge of the AMPs justifying a case to set up a post basic training programme either to prepare

the students for a particular examination or at least as a routine in-service training for the AMP, especially from the state sector.

Results of the post-test

When the MCQ and MEQ marks of the Gampaha group (control group) were statistically analysed, the P value of the significance of difference between pre and post test marks were found to be more than 0.05 for Gynaecology & Obstetrics (Tables II & IV). This suggests that there has not been any improvement in Gynaecology & Obstetrics amongst the Gampaha group (CG) trainees. This seems to indicate that clinical exposure would benefit such trainees.

The P value of significance of difference between the pre and post test marks for Gynaecology & Obstetrics, for Kalutara (TH) and Puttalam (NTH) groups also indicate that there had not been much improvement. These findings indicate that the Gynaecology & Obstetrics clinicals should be further strengthened and that the training provided during the period of this study for the Kalutara (TH) and Puttalam (NTH) trainees seemed to be insufficient.

The Gampaha group (CG) showed significant improvement in Medicine and Surgery as well as in Paediatrics. However, method B (for marking MCQs) did not show a significant change in Paediatrics and Gynaecology & Obstetrics. Therefore, the overall result is, that except in the case of Gynaecology & Obstetrics, the control group (CG) showed significant improvement.

In general, the group that did not show a significant improvement was the Puttalam group (NTH). This group seemed to have only marginally improved in Paediatrics and Medicine, suggesting that their clinical exposure would have been insufficient.

These findings raise the question as to how the control group improved significantly without any clinical exposure. The explanation may lie in the fact that the control group who had already been warned about not being provided with clinical training, would have relied exclusively on the modules which contained all the necessary information. Those who belonged to the teaching hospital and non-teaching hospital groups on the other hand, may have expected to support their reading of the learning modules by attending the clinical classes in all the disciplines.

When the performance of the Kalutara group (TH) was compared with that of Gampaha group (CG), both groups showed highly significant improvement in Medicine. This suggests that the topic selected in Medicine had been easy to follow even without sufficient clinical input.

CONCLUSIONS

- When tested, the base level knowledge of AMPs in the four selected clinical disciplines was found to be unsatisfactory.
- The group (CG) that followed only the learning modules showed a significant improvement in all disciplines except in Gynaecology and Obstetrics.
- It was observed that in certain topics, especially those belonging to surgically based disciplines (Surgery and Gynaecology & Obstetrics), some form of clinical exposure would have been beneficial to improve the knowledge base of and teach new skills to participants.

- The performance of the Teaching Hospital group (Kalutara -TH) was found to be better than that of the Base Hospital group (Puttalam -NTH).
- Distance teaching could be used as an effective method of continuing education for Health Workers in some of the clinical disciplines.

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