Feasibility of training Female Health Workers to diagnose and treat reproductive tract infections of females at the community level – a study done at Christian Medical College, Vellore

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Abstract- **Background:** Infections of the reproductive tract in females is a major public health concern because of the associated morbidity. Women often delay seeking care for problems pertaining to the reproductive tract, as they feel shy to take these problems to a doctor, especially a male doctor. Moreover, health services are usually not accessible to the rural people and the urban poor. The nurses and paramedical workers are not trained to deal with gynaecologic diseases, and the availability of doctors in rural areas is very limited. **Objectives:** This study aims to assess the validity of diagnosis of the reproductive tract infections by the Female Health Worker, after a period of training. **Material and Methods:** 10 female health workers (known as Health Aides) of the Community Health Department of the Christian Medical College Vellore, were provided training in diagnosing the reproductive tract infections from visual examination of the vaginal discharge using a speculum. Training was also provided in counselling the patient and the partner.
Results: The validity of diagnosis by the Health Aides showed a sensitivity of 87 %, a specificity of 91%, Likelihood Ratio of 8.7, Positive Predictive value of 85.95. Kappa for agreement between the trainer and the Health Aide was 74.3%.
Conclusions: Utilising the skills of the Female Health Workers would overcome the problem of accessibility and lack of availability of a female doctor, and contribute positively to the reproductive health of the community, especially the rural poor who have poor access to services, and thus ensure an optimum level of health for all.

Index Terms- reproductive tract infections, India, Female Health workers, training

I. INTRODUCTION

World Health Organization defines reproductive health as a condition in which reproduction is accomplished in a state of complete physical, mental and social well being, and not merely the absence of disease or disorders of the reproductive process.[1] Control of reproductive tract infections, especially sexually transmitted infections contributes positively to reproductive health. This is especially important because reproductive tract infections play an important role in the transmission of Human Immunodeficiency Virus (HIV).[2] A study conducted by the Department of Medicine and Epidemiology of the University of Washington among HIV positive women showed that vaginal HIV transmission decreased by 3.2 fold and 4.2 fold after treating candida and trichomonal infections respectively. [3] Reproductive tract infections (RTIs) are associated with adverse health outcomes such as infertility, intrauterine growth retardation, premature labour, and increased vulnerability to HIV/AIDS.[4]

The WHO estimates that each year, there are over 333 million new cases of curable sexually transmitted infections.[5] Though these infections affect both men and women, the brunt is borne mostly by the women, because of various factors like shyness, lack of a female health care provider, lack of accessibility of health care.[6] A study conducted in Tamil Nadu showed that 15% of women in the reproductive age group had sexually transmitted infections and 28% had endogenous infections.

Two-thirds of the symptomatic women had not sought any treatment - the reasons cited were absence of a female health care provider in the nearby health care centre, lack of privacy, distance from home, cost and a perception that their symptoms were normal.[7] In another study in rural Tamil Nadu, a total of 452 women were interviewed and 235 of them were found to be suffering from RTIs giving a prevalence of 51.9%.[8] Bang et al reported 62% women suffering from vaginitis clinically in Gadchiroli, rural Maharashtra.[9]

Symptoms like white discharge are accepted as normal and women do not seek care for this due to a feeling of shame or guilt, owing to its perceived link with promiscuity.[10] Moreover, health services are not accessible to the rural people and the urban poor. The availability of doctors in rural areas is very limited, and the nurses and paramedical workers are not trained to deal with gynaecologic diseases. In response to these problems, the WHO came up with the Syndromic approach, which helps in making a diagnosis based on the presence of groups of symptoms and signs. Treatment is given for all possible organisms that would cause the particular syndrome. However, this tends to be nonspecific, and leads to overtreatment. Incorporating the use of a speculum for examination was found to overcome this problem, however only doctors are trained to do a speculum examination.

Various studies have shown that training health workers to contribute to the general health care in diagnosis and management has been quite successful.[11,12] Moreover, in the presence of clear guidelines, prompt treatment of patients on the spot is more effective, as referral to higher centres may result in drop-out of a significant number of patients. [13]The female health worker, because of her proximity and good rapport with the women in the community, can be trained to provide these services. Training of nurses, health workers, dais, anganwadi workers regarding RTI identification and referral using syndromic approach and promotion of menstrual hygiene, genital hygiene and health care seeking behaviour have been shown to help in reducing the burden of RTI in the community.[14] Going one step further, if the health workers are trained to do a speculum examination to identify the probable infection from the nature of the discharge, and provide the appropriate treatment, it would overcome the problem of drop-out of referrals. If successful, this could later be replicated in the wider government system with the aid of the Village Health Nurse, who already possesses the skill for speculum examination, having been trained for Cu-T insertion.

II.   Materials and Methods

The study was conducted in Kaniyambadi, a rural block of Vellore district, in the state of Tamil Nadu in South India, where the Community Health Department of the Christian Medical College, Vellore provides the primary health care services. The Female Health Worker (know as Health Aide), is an important link in the system providing the primary health care. The Health Aides are women with a basic education of up to the tenth standard, who undergo training for one and a half years, during which period they are taught the basics of female anatomy, physiology, reproduction and conduction of normal deliveries. They are expected to register and report pregnancies, births and deaths, provide health education, report any unusual occurrence of morbidity and assist in the investigation of epidemics. They are similar in training and hierarchy to the Village Health Nurse of the Government system.

The study consisted of two components
   1. Training of the Health Aides in diagnosing reproductive tract infections in women - history taking, speculum examination, diagnosis and counselling.
   2. Assessing the validity of diagnosis of the Health Aides.

Since after a search it was found that a training manual was not available, a training module was prepared by the principal investigator and this was used to impart training to the health workers.

Training was conducted over a period of 6 months, in the local language and was carried out in an informal manner, keeping in mind the educational level and age of the health workers. A judicious mix of different teaching methods and aids was used – lectures, demonstrations, anatomical models, role play and examination of patients. Pre-test and post-test evaluation was done to assess if the objectives of the training were met. After it was ascertained that the Health Aides were able to confidently perform a speculum examination, they were taken into the community to assess the reliability of the diagnosis.

Assessing reliability

After all the Health Aides had gained adequate competence in examining women using a speculum and were able to identify the clinical findings satisfactorily, the reliability of their diagnosis was assessed. A sensitivity and specificity each of 90% was considered acceptable. The sample size was calculated for a sensitivity of 90%, and precision of 10%, using the formula $4pq/d^2$.

P, sensitivity =.9, q = 1-p, i.e. 0.1 and d=10%
The sample size worked out to 36.

An earlier study done in the same rural block had shown that 50% of women with a complaint of vaginal discharge would actually have a reproductive tract infection and that the prevalence of reproductive tract infections among women in the age group of 15-45 years was 50%.[16]

Therefore, it was inferred that each Health Aide would have to interview 144 women to obtain 72 women with a history of vaginal discharge, expecting 38 out of these to have positive findings.

Selection of the sample

Women were selected from one of the villages covered by the particular Health Aide. The village was selected at random, and a street from the village was randomly selected. The Health Aide asked every woman in the age group of 16-45 years living in that street for complaint of white discharge, until 76 women were found. If enough number of women with a positive history were not found, the next street was included and so on till the required number of women was reached.

A form was required to be filled for each patient, it consisted of 2 sections:

Section A – was for recording the history and consisted of details of duration and nature of the discharge, presence of other symptoms of reproductive tract infections, presence of related complaints in the sexual partner. At the end the Health Aide was required to conclude if the discharge could be normal or pathological.

Section B- this consisted of the findings of the examination of the external genitalia followed by speculum examination where they were required to note the condition of the vagina, details of the discharge, condition of the cervix, the vaginal pH checked by using a litmus paper and the diagnosis.

The investigator accompanied the Health Aide to the house of each woman and observed the following:
   1. History taking
   2. Convincing the woman for a speculum examination in case of a positive history
   3. Arranging for speculum examination
   4. Speculum examination and the findings
   5. Advice to the woman in case of a positive finding on speculum examination

The investigator also examined the nature of the discharge at the same time as the Health Aide was doing the speculum examination and the findings were put down on separate forms, for analysis later. This gave an opportunity to the investigator to observe the knowledge, attitude and skills of the Health Aide.
The data was analysed using Epi Info6.04b and SPSS 9.0 for Windows.

III. RESULTS

Seventeen Health Aides underwent training. All seventeen were evaluated for knowledge, attitude and skills. However, the assessment of reliability of diagnosis was done for only the ten Health Aides who were going to be a part of the intervention project.

Table 1 Age distribution of the Health Aides

Age	Frequency	Percent
35-39	6	35.3
40-44	3	17.6
45-49	6	35.3
>49	2	11.8
Total	17	100

Table 2 Performance of the Health Aides in the pre-test

Test	Mean (%)	Median (%)	Range
Theory	62	62	48-78
Practical	34.2	34.3	21-56
Total	51.8	52	38-63

Table 3 Performance of the Health Aides in the post-test

Test	Mean (%)	Median (%)	Range
Theory	73.9	75	60-89.2
Practical	58.1	57	43-73
Total	68.7	70	61-83

There was a significant difference in the pre-test and post-test mean scores.

Table 4 The validity of the diagnosis made by the Health Aides

Diagnosis by the Trainer

Diagnosis by Health Aide	Infection +	Infection -	
Infection +	110	18	128
Infection -	16	181	197
Total	126	199	325

Sensitivity – 87% (95% CI 86.78-87.22)
Specificity – 91% (95% CI 90.96-91.03)
Likelihood Ratio – 8.7
Positive Predictive value – 85.9%

Table 5 Distribution of sensitivity, specificity and likelihood ratio of the diagnosis by the health workers

Health worker	Sensitivity (%)	Specificity (%)	Likelihood Ratio
1	85.7	93.3	12.8
2	77.7	95.8	18.5
3	93.3	90	9.3
4	83.3	100	8.3
5	100	81.8	5.5
6	100	90	10
7	86.6	72	3.1
8	100	94.4	17.9
9	72.7	94.7	13.7
10	81.8	100	8.2

The lowest sensitivity was 72.2% and the highest 100%.
The lowest specificity was 72% and the highest 100%

Table 6 Agreement between the diagnosis of the Health Aide and the Trainer

HA/Trainer	Normal	Candidiasis	Trichomonas Vaginalis	Bacterial Vaginosis	Mixed Infection	Total
Normal	181	5	8	2	1	197
Candidiasis	6	35	2	0	3	46
Trichomonas Vaginalis	5	1	44	1	4	55
Bacterial Vaginosis	6	1	1	12	0	20
Mixed Infection	1	0	1	0	5	7
Total	199	42	56	15	13	325

The percentage agreement was 74.3%, CI 74.25-74.32

Correlation between the pre-training and post-training performance showed a positive correlation. The 'r' value was 0.5384, significant at p=0.026.

Correlation between the age of the Health Aide and the % post –training score was negative. The 'r' value was -0.599, significant at p=0.011, which means that the performance is poorer among Health Aides who are older.

There was no correlation between post-training score and the Likelihood Ratio. The 'r' value was 0.268 which was not significant.

IV.   Discussion

The training of Health Aides was conducted for a total of 48 hours spread over 20-24 weeks, so as to allow them to carry on with their routine work.

The situation analysis, through needs assessment and task analysis done at the outset through discussion with the Health Aides helped to identify the areas requiring training. It also ensured participation of the trainees in the training program from an early stage.

The written test was in the form of multiple choice questions, and the practical test was in the form of Objective Structured Practical Examination and consisted of 3 stations – one on counselling, one on demonstration of use of condom, one on speculum examination. In the pre-test the speculum examination was on the model of the pelvis whereas in the post-test it was on a patient.

There was a significant difference in the performance in the pre-test and post-test, in both the theory and practical. The overall sensitivity of diagnosis was 87% and the overall specificity of diagnosis was 91%, which are good.

It is difficult to compare ten subjects across the board in terms of sensitivity and specificity. Some tend to have a higher sensitivity and others higher specificity. Likelihood Ratio helps to overcome this problem. By and large, a good diagnostic test with a sensitivity of 90% and a specificity of 90% should yield a Likelihood Ratio of 9, which means that a woman who is diagnosed to have a reproductive tract infection by the Health Aide, has 9 times greater odds of having the disease as compared to the pre-test odds. In this case the Likelihood Ratio is 8.7.

The Kappa, calculated for agreement between the diagnosis of the doctor and the Health Aides is 74.3%, with a narrow Confidence Interval of 74.25-74.32, which is a good degree of agreement.

The tests for correlation show that those Health Aides who had done well in the pre-training evaluation also did well in the post-training evaluation.

The test for correlation between the age of the Health Aides and their post-training performance shows that the older Health Aides have not performed so well. It is probably difficult to learn new skills at an older age.

There is no correlation between the post-training performance in the written and practical examination, and the Likelihood Ratio of their diagnosis from a speculum examination. Therefore, the diagnostic reliability of a Health Aide cannot be assessed with the help of written and practical examination alone.

Evaluation of the technique of speculum examination was carried out with the help of a checklist in the field setting. The skills checked were – explanation to the patient about the examination, the ability to select the appropriate place for examination, the sterile precautions and the explanation to the patient after the examination. The overall performance was found to be satisfactory, with an average score of 75%.

A study conducted in the same department, where the Balwadi teachers were trained to identify ear problems through an examination of the children's ears using a head mirror showed a sensitivity and specificity of more than 80%, as against 87% and 91% respectively in our study.[15]

In a study undertaken in Tamil Nadu to examine if the Village Health Nurse (VHN) could be trained to identify a cervical abnormality by visual inspection, the agreement between the gynaecologist and the VHN was 95%. However, the present study did not show such a high degree of agreement. The number of cases of specific infections was not adequate. This was similar to the problem faced by the WHO and UNICEF during the training of health workers in the Integrated Management of Childhood Illnesses.[16]

V.   Conclusion

Search of the literature showed that training health workers to provide health care services has been quite successful in improving the quality of services. The Department has a similar experience, where the Traditional Birth Attendants have been trained to conduct deliveries under hygienic conditions and have made a great contribution to improvement in the maternal health status in the block. Anganwadi workers have been successfully trained to recognise and manage common ear problems.[17] Therefore it can be presumed that the Health Aides or the female multipurpose health workers can be used to provide diagnostic and curative services at the periphery.

Preparation of the training module based on the needs assessment and performance in the pre-test made the lessons relevant and focused. Employment of various aids of teaching helped to sustain the enthusiasm of the Health Aides.

From this study it is seen that utilising the skills of the Health Aides would definitely contribute positively to the reproductive health of the community, especially the rural poor who have poor access to services, and ensure an optimum level of health for all.

VI.   Recommendations

Upgrading the skill set of the health workers will help to improve the availability and accessibility of health services to the rural poor and the remote areas. This will also make the health workers more empowered in improving the health of the community, and give them a better status in the community, thus improving their acceptance by the people.

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