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Original Research Article

A study on training frontline health workers for prevention, early recognition and treatment or transfer of women with post-partum haemorrhage using mamanatalie

Nikhita B. Vadvadgi*, Nageshu Shailaja, Lingegowda Krishna, Kirtan Krishna

Department of Obstetrics and Gynecology, PES Institute of Medical Sciences and Research, Kuppam, Andhra Pradesh, India

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***Correspondence:**
Dr. Nikhita B. Vadvadgi,
E-mail: nikhitabv@gmail.com

ABSTRACT

Background: The objective of the present study was to train frontline health workers (FHW) on prevention, early recognition and treatment/transfer of women with post-partum haemorrhage using mamanatalie and to compare their pre-training and post training knowledge and skills, and to reassess the knowledge and skills of the trainees after six months.
Methods: Training of 159 FHW belonging to the nine Primary Health Centres (PHC) of Kuppam constituency was conducted using mamanatalie. Pre and post training knowledge and skill assessment were compared using questionnaires and the mamanatalie. Reassessment of knowledge and skill was done after six months.
Results: Among 159 participants 93% scored more, 3% scored same and 4% scored lesser in post training when compared to pre-training test. In the follow up knowledge assessment after six months 73 trainees were lost for follow up, among the remaining, 8% scored more, 16% scored same and 76% scored less when compared to the post training test. However, the follow up scores were higher than the pre-training scores. In the skill test, 82% scored more than 80%. Four trainees were lost for follow up skill assessment, among the remaining, 16% scored more, 23% scored same and 61% scored less when compared to the initial skill test scores
Conclusions: The training increased knowledge, skill and confidence among the trainees. It has the potential to lead to improved clinical outcomes, especially in the rural areas. Revision sessions may help in better retention of knowledge and skill.

Keywords: Frontline health workers, Mamanatalie, PHCs, Postpartum hemorrhage

INTRODUCTION

Women are crucial to social and economic development. Their health and wellbeing matter not only to themselves, but also to their families and to the community.

Though various programmes have been launched to provide primary health care to women and children, their impact has not been significant particularly in rural areas.[1] In many developing countries, national health statistics are characterized by high rates of maternal morbidity and mortality. Complications during pregnancy and childbirth are the most significant causes of death among women of reproductive health age.[2]

More than half of these maternal deaths occurring globally do so in the first 24 hours after childbirth, and most of these deaths are due to postpartum haemorrhage (PPH).[3,4] Approximately 25 percent of all maternal deaths are due to haemorrhage; with percentages varying from less than 10 percent to almost 60 percent in different countries. The proportion needing hospital care depends,

to some extent, on the quality of the first-level care provided to women; for example, active management of the third stage of labor reduces total blood loss, incidence of retained placenta, length of third stage, and PPH.[5,6]

If a woman has PPH, she requires urgent care which may include a fairly simple but urgent intervention such as uterotonic drugs (oxytocin) and uterine massage for uterine atony, manual removal of the placenta, or suturing of genital lacerations.

Other women may need a surgical intervention or a blood transfusion, both of which require hospitalization with appropriate staff, equipment and supplies. The proportion of women who die depends on whether appropriate care is provided rapidly.

Current evidence indicates active management of the third stage of labor (AMTSL) can reduce the incidence of postpartum hemorrhage by up to 60 percent, provided:

- Health workers receive training in using AMTSL and administering uterotonic drugs.
- Injection safety is ensured.
- Necessary resources (uterotonic drugs and cold chain for storage of uterotonic drugs; equipment, supplies, and consumables for infection prevention and injection safety) are available.[5]

MamaNatalie is a birthing simulator that comes with NeoNatalie which helps to create realistic training scenarios easily. It is designed to facilitate an engaging role play which will make learning scenarios memorable and efficient.

This study aimed at preventing PPH by training frontline health care workers using the aid of a birth simulator-mamanatalie.

Training will prevent the referral of patients in a moribund state to higher centers and will ensure that the patient will receive a fairly simple, feasible but urgent intervention before referral to a higher centre.

METHODS

An educational interventional study was conducted in all the nine Primary Health Centers in Kuppam constituency located at Gudupalli, Paipalyam, Ramakuppam, Vijilapuram, Rallaboodagur, Mallanur, Shanthipuram, Kangundi and Veernamala Thanda over a period of one and half years.

Inclusion criteria

- All the Frontline Health Workers (FHWs) belonging to the Primary Health Centres of Kuppam constituency and others who were willing to participate in the training programme.

Exclusion criteria

- All those, who have undergone training in the management of PPH in the last three months.

Figure 1: Geographical map of various P. H. Cs in Kuppam constituency.

Materials used

Mamanatalie, audio visual aids, blackboards, posters, flipcharts and models.

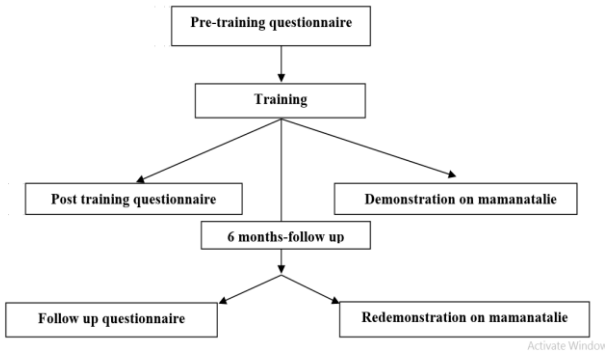

Figure 2: Study design.

Method of data collection

The study was conducted over a period of one and half years in the Primary Health Centres, which included initial training and immediate post training assessment of knowledge and skills, and a follow up after six months to reassess the knowledge and skills of the trainees.

The participants were of different cadres and included the PHC medical officers, Auxiliary Nurse Midwives (ANMs), Female and Male Health Workers (FHWs, MHWs), Female and Male Multipurpose health Assistants (FMHAs, MMHAs), Lab Technicians (LTs),

Pharmacists, Ambulance drivers and Accredited Social Health Activists (ASHAs). The same standardized questionnaires were used for all participants.

Procedure

A team from Peoples Educational Society's Institution of Medical Sciences and Research (PESIMSR) consisting of a doctor (myself), nurse and a public relation officer visited one Primary Health Centre every month and conducted training in prevention, early recognition and treatment or transfer of PPH using mamanatalie on first Tuesday of every month when all the PHC staff gathered for their "ASHA day".

A pre-training questionnaire (Appendix 1) was distributed to be answered by all the trainees. Questionnaires were collected back before starting the training session. This helped to:

- Assess what the learner knows about the course topics.
- Identify topics that may need additional emphasis during the course.
- Alert the learner to the content that will be presented in the course.
- Identify each learner's individual learning needs.

Training was conducted regarding prevention, early recognition and treatment or transfer of women with post-partum haemorrhage. Demonstration of normal labour was enacted by our team using mamanatalie at the end of training programme.

A fresh copy of the same questionnaire "post training questionnaire" was again distributed to be answered by all trainees and collected back. This evaluates the newly acquired knowledge before beginning demonstration on the mamanatalie.

Only the medical officers, ANMs, Health Assistants and Multipurpose Health workers who are authorized to conduct normal deliveries were called forward to re-demonstrate normal labour on the mamanatalie and their skills were evaluated using the "evaluation checklist" (Appendix 2).

PHCs were visited six months later for the purpose of follow up. All the available staff who had participated in the initial training programme, were given a fresh copy of the same questionnaire to assess the 'follow up knowledge'.

All the medical officers and ANMs who had participated in the demonstration of normal labour earlier were asked to re demonstrate to assess their 'follow up skills'. Improvement in knowledge was assessed by comparing the pre and post training questionnaires. The utilization and retention of knowledge was assessed with follow up questionnaires. Similarly, skill was also assessed.

Reporting the outcome

Knowledge test

- Pre-training knowledge was assessed by evaluating pre-training questionnaire and was scored out of twenty
- Post training knowledge was assessed by evaluating post training questionnaire and was scored out of twenty
- Follow up knowledge test after six months was assessed by evaluating the follow up questionnaire and was scored out of twenty

Skill test

- Initial demonstration of normal labour on the mamanatalie was scored out of fifteen using the 'evaluation check list' (Appendix 2).
- Same was re-demonstrated on the mamanatalie after six months and scored out of fifteen using the same 'evaluation check list' (Appendix 2).

Deciding the inference of the study

The study would be pronounced efficient if:

- 80% or more trainees scored higher in the post training questionnaire compared to pre-training questionnaire.
- 80% of trainees scored 80% or more in the initial skill test, i.e. 12 or more out of 15.

The follow up performance varied due to memory bias. It improved, deteriorated or remained the same due to several reasons.

The follow up test details serve as a critical entity to decide the appropriate time for adopting interventional strategies like revision sessions before the memory of the trainees begin to fade.

Statistical analysis

Data was entered in Microsoft Excel and analysed using SPSS version 17. The demographic data was analysed as frequencies, measures of central tendency and dispersion. Paired t test was used to compare the pre and post training knowledge and skill scores. ANOVA (Analysis of Variance) was used to study the difference in mean knowledge and skill scores between the PHCs.

RESULTS

A total of 159 members from all the PHCs of Kuppam mandal who were either directly or indirectly involved in conducting deliveries were trained using mamanatalie. Table 1 shows the PHC wise distribution of the participants. There were a total of 159 members from

nine PHCs who participated in this study. There were highest number of participants from Rallaboodaguru PHC (24), closely followed by the Mallanur PHC (23). Least participation was from Veernamala Thanda PHC (5).

Table 2 represents measures of central tendency (Mean, median, standard deviation minimum and maximum scores) of the pre-training, post training, skill tests and follow up knowledge, skill tests. It shows that, in the post training test: 93% scored more, 3% scored same and 4% scored less when compared to pre-training test. In follow, up knowledge assessment: 8% scored more, 16% scored same and 76% scored less when compared to the post training test.

- 73 trainees were lost for knowledge follow up.
- In the skill test: 82% scored more than 80%.
- Follow up skill assessment: 16% scored more, 23% scored same and 61% scored less when compared to the initial skill test scores.
- Four trainees were lost for skill follow up.

Table 1: PHC wise distribution of participants.

PHC	Number of participants	%
Gudupalli	18	11.3
Kangundi	18	11.3
Mallanur	23	14.5
Paipalyam	18	11.3
Rallaboodaguru	24	15.1
Ramakuppam	20	12.6
Shanthipuram	15	9.4
Veernamala thanda	5	3.1
Vijilapuram	18	11.3
Total (%)	159	100

Table 2: Measures of central tendency (mean, median, standard deviation minimum and maximum scores) of the pre-training, post training, skill and follow up knowledge, skill tests.

	Pre-training knowledge test (out of 20)	Post training knowledge test (out of 20)	Initial post training skill test (out of 15)	Follow up knowledge test (out of 20)	Follow up skill test (out of 15)
N					
Valid	159	159	55	86	51
Missing	0	0	104	73	108
Mean	9.54	15.23	13.51	14.51	12.88
Median	9	16	14	15	13
Mode	9	16	14	16	13
Standard deviation	2.628	2.833	1.289	2.905	1.351
Minimum	2	6	9	7	10
Maximum	18	20	15	19	15

Table 3: PHC wise comparison of the pre-training knowledge test scores of participants.

PHC	Number of trainees	Mean	Standard deviation	P-value
Gudupalli	18	11.39	2.933	<0.01
Kangundi	18	9.83	3.869	
Mallanur	23	8.30	2.077	
Paipalyam	18	7.83	2.036	
Rallaboodaguru	24	11.13	2.346	
Ramakuppam	20	8.60	2.162	
Shanthipuram	15	9.93	1.944	
Veernamala Thanda	5	9.40	1.140	
Vijilapuram	18	9.33	1.085	
Total	159	9.54	2.628	

It was seen that, 82% of the participants scored more than 80% in the initial post training skill test where they were made to demonstrate normal delivery including active management of third stage of labour on the mamanatalie. This shows that most participants could recall what was taught to them and re demonstrated the same with great skill.

And, according to the initial criteria that was set, we can pronounce the training as being efficient. Table 3 shows the PHC wise comparison of the pre-training knowledge

test scores of participants. Participants form Rallaboodaguru PHC scored the highest, while the participants from Veernamala Thanda scored the least.

Table 4 signifies the PHC wise comparison of the post training knowledge test scores of participants. Participants form Veernamala Thanda PHC scored the highest, while the participants from Paipalyam scored the least.

Table 5 represents the PHC wise comparison of the initial post training-skill test scores of participants. Participants form Ramakuppam PHC scored the highest, while the participants from Gudupalli scored the least.

Table 4: PHC wise comparison of the post training knowledge test scores of participants.

PHC	Number of trainees	Mean scores	Standard deviation	P value
Gudupalli	18	16.11	1.779	
Kangundi	18	17.67	1.940	
Mallanur	23	15.17	2.498	
Paipalyam	18	10.56	1.917	
Rallaboodaguru	24	15.08	1.717	
Ramakuppam	20	15.20	1.399	<0.01
Shanthipuram	15	17.87	0.743	
Veernamala thanda	5	18.20	1.095	
Vijilapuram	18	13.89	2.847	
Total	159	15.23	2.833	

Table 5: PHC wise comparison of the initial post training-skill test scores of participants.

PHC	Number of trainees	Mean scores	Standard deviation	P value
Gudupalli	9	12.67	2.062	
Kangundi	10	12.80	1.135	
Mallanur	8	13.75	0.886	
Paipalyam	8	14.00	1.069	
Rallaboodaguru	7	14.00	0.577	
Ramakuppam	3	14.67	0.577	0.11
Shanthipuram	4	14.00	0.816	
Veernalmala thanda	1	13.00		
Vijilapuram	5	13.60	1.140	
Total	55	13.51	1.289	

Table 6: PHC wise comparison of the follow up- knowledge test scores of participants.

PHC	Number of trainees	Mean scores	Standard deviation	P value
Gudupalli	11	15.64	1.286	
Kangundi	9	16.78	2.167	
Mallanur	9	17.00	1.323	
Paipalyam	11	8.82	0.982	
Rallaboodaguru	10	15.00	1.826	
Ramakuppam	17	13.71	1.611	
Shanthipuram	13	16.08	1.498	
Veernalmala thanda	1	16.00		<0.01
Vijilapuram	5	13.4	1.949	
Total	86	14.51	2.905	

Table 6 characterizes the PHC wise comparison of the follow up, knowledge test scores of participants. Participants form Mallanur PHC scored the highest, while the participants from Paipalyam scored the least.

Table 7 signifies the PHC wise comparison of the follow up, skill test scores of participants. Participants form Ramakuppam PHC scored the highest, while the participants from Kangundi scored the least.

Tables 3, 4, 5, 6 and 7 show that not much of a difference was noted in the PHC wise analysis of the knowledge test, skill test, follow up knowledge and follow up skill tests, those which fared well in some categories did not do so well in others. However, the participation from the Veernamala Thanda was noticeably low compared to other PHCs.

Table 7: PHC wise comparison of the follow up, skill test scores of participants.

PHC	Number of trainees	Mean scores	Standard deviation	P value
Gudupalli	9	12.11	1.453	0.02
Kangundi	9	11.78	1.481	
Mallanur	8	13.13	1.126	
Paipalyam	6	13.17	0.983	
Rallaboodaguru	6	13.67	1.211	
Ramakuppam	3	14.00	1.000	
Shanthipuram	4	13.75	0.957	
Veernalmala thanda	1	12.00		
Vijilapuram	5	13.4	0.548	
Total	51	12.88	1.351	

DISCUSSION

This mamanatalie-based training program has the potential to contribute to education of frontline health workers. This is of particular concern in developing countries where births are often attended by midwives or auxiliary nurse midwives who may not have received sufficient training or have sufficient competencies in the management of PPH.

Mean knowledge scores increased immediately after training from 47.7% to 75% in present study which showed a similar increasing trend from 70 % to 77 % in the study done by Nelissen E et al.[7] Follow-up knowledge scores (70 %) decreased compared to immediate post training scores (75%) but higher than pre-training levels (47.7%). This trend was comparable to the study conducted by Nelissen E et al where the pre-training, post training and follow up mean scores were 70%, 77%, 72% respectively.[8]

On comparing present study with respect to knowledge and skill scores with another study by Cherrie L. Evans et al, which was undertaken in a rural referral hospital in Northern Tanzania where clinicians, nurse-midwives, medical attendants, and ambulance drivers involved in maternity care were trained in March 2012 using a train-the-trainer model, it was found to have similar results, i.e., the trainees scored higher in the skilled test compared to knowledge test after the training. The conclusion of their study was also similar that the HMS BAB simulation-based training had potential to contribute to education of health care providers.[9] Results of knowledge and confidence among skilled and semiskilled birth attendants were comparable with the study done by D. M. Satishchandra, V. A. Naik, A.et al, it was found that the knowledge and confidence scores improved significantly from pre- to post-training among all cadres in all three countries.[10] The study strengths include implementation in all the nine Primary

Health centres under Kuppam and application to a wide array of trainee cadres. Training relied heavily on graphical and audiovisual materials and was not primarily language dependent. Although questionnaires were in Telugu, the training was done in Kannada and Tamil as and when required catering the needs of certain trainees. As obstetric emergencies are rare events, this training using birthing simulators is a huge advantage where emergencies can be simulated to train the participants and build confidence in them to manage a real case if it were to happen in their presence. The weaknesses of the training include that the mean scores of both the knowledge and skill tests were lower during follow up after six months. However, it was significantly higher compared to their baseline pre-training mean scores. This fallacy could be corrected by having more frequent revision sessions at frequent intervals to brush up their memories.

The other major weakness was that a large number of trainees were lost for follow up. This was tried to be avoided by giving a prior notification to the respective PHC before conducting the follow up test but did not help much. To optimize this training, frequent practice following initial introduction of the training is advocated. Additionally, effectiveness or impact evaluations will be needed comparing competency, performance, and outcomes of providers who receive this training approach with providers who receive traditional training. Training resulted in significant gains in confidence among all birth attendants. The participants found the training methods highly acceptable, including length of the training, use of the simulators, length of time for practice, building confidence in skills, and use of mixed cadres during

training, as well as overall understandability and ease of use.

CONCLUSION

Training programmes of this kind have enormous potential in improving the knowledge, skills and confidence amongst the frontline health workers and others who are either directly or indirectly involved in conducting deliveries at the village level. More research is required to identify the best approaches for preventing and managing postpartum bleeding and its complications. By training skilled birth attendants, improving work environments of skilled providers, and supporting the development of improved access to care; more women will have access to this lifesaving intervention.

This whole training programme was a sincere initiative taken by our team to help mothers deliver safely at the village level as we believe that it is not acceptable to let mothers die due to child birth. However, this extensive work is equivalent to only a tiny drop of water in the ocean and much more work is to be done at a larger scale to improve the present health situation and to ultimately reduce maternal mortality.

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Appendix

1. Pre-training questionnaire, post-training questionnaire and follow up questionnaire-in english

Multiple choice

Circle the best response for each question. Each question is worth 1 point. No negative marking.

Scientific evidence:

1) Which of the following statements describes a disadvantage of physiologic management of the third stage of labour?

a) It increases the length of the third stage of labour.
b) It does not interfere with the normal process of labour and childbirth.
c) It reduces the risk of pph.
d) It reduces average amount of blood loss.

2) Which of the following statements describes an advantage of amtsl?

a) It requires the presence of an sba who can administer injections.
b) It reduces the amount of blood loss after childbirth.
c) It increases the risk of pph during the third stage of labour.
d) It increases the length of the third stage of labour.

Review of uterotonic drugs:

3) Under ideal condition, oxytocin should be stored:

a) In a refrigerator, between 2°c –8°c.
b) In an open kidney dish in the delivery room.
c) In a drawer in the midwife's office.
d) In a coat pocket to facilitate its use.

4) Which of the following statements about augmentation of labour is false:

a) Labour should be augmented only if clear emergency or obstetric conditions are present, and a physician is readily available to perform a caesarean delivery should complications arise.
b) If a woman requires augmentation of labour, she should be immediately referred to a health care facility with the capacity to perform a caesarean operation.
c) Oxytocin can be safely administered im in labour if accompanied by an antispasmodic medication.
d) If oxytocin is used for labour augmentation, it should be administered by controlled iv drip in a health facility that has an operating theatre and qualified physician to perform an emergency caesarean operation.

5) Which of the following statements about oxytocin is true:

a) Oxytocin acts within six to seven minutes.
b) Oxytocin is associated with the following side effects: chills and elevated temperature.
c) Oxytocin is less stable than ergometrine when exposed to heat or light.
d) Oxytocin has no known contraindications for postpartum use.

Fifteen other questions were framed based on post partum haemorrhage and active management of third stage of labour

2. Evaluation checklist-for assessment of skills.

Steps	Scoring
Emotional support	
Explains the procedure that would be done in detail	
Preparation	
Puts the patient in the dorsal posture	
Paints the parts	
Ensures that the bladder is empty or empties it on table using a catheter	
Ensures that iv line is secured and inj. Syntocin is on flow	
Keeps all the emergency drugs at reach	
Immediate newborn care	
Thoroughly dries the baby while assessing the baby's breathing	
Calls for help or begins resuscitation if the baby is not crying or breathing at least 30 times a minute within 30 seconds of birth	
Places the baby in skin to skin contact with the mother and covers the baby with a clean, dry cloth not forgetting to cover the head of the baby.	
Amtsl step 1:	
Administration of a uterotonic drug after the birth of the baby	
Amtsl step 2:	
Performs controlled cord traction by providing counter traction at the uterine fundus with the other hand	
Ensuring the completeness of the placenta	
Performs a through visual inspection not to miss out any perineal tears.	
Amtsl step 3:	
Uterine massage	
Teaching the patient how to massage her own uterus and asking her to do it for about 20 minutes.	

Scoring: 1 point is given for tasks performed correctly and 0 points for tasks performed wrongly or tasks not performed. Total score is calculated and converted to percentage.