

## Original Research Article

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# Standard operating procedure for the management and prevention of post-partum haemorrhage in a public general hospital in rural South India: a quality improvement project

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## ABSTRACT

**Background:** The Obstetrician stationed in a Public General Hospital noticed that there were no standard guidelines nor any assessment tool for the management of post-partum hemorrhage (PPH). This developed the idea to prepare a standard protocol.

**Methods:** Aiming to ensure prevention and proper management of PPH in the Maternity ward, a team was formed to perform a Quality improvement project (QIP). A Standard operating procedure (SOP) was formulated referring to the National Health Mission (NHM). Outcome indicators were defined. A series of interventions were implemented and assessed using Plan-Do-Study-Act (PDSA) cycles. The findings from the PDSA cycle of a previous intervention were used to implement change in the next intervention. The data was analysed to accept the change or to further modify it.

**Results:** At the end of 3 months, percentage of patients with PPH reduced by 3%, percentage of patients diagnosed with PPH within the 1st hour increased by 50%, percentage of patients with PPH treated appropriately increased by 20% and percentage of patients requiring referral due to PPH decreased by 15%. Thus, at the end of 3 months there was significant improvement in the values of the outcome indicators.

**Conclusions:** In the span of few months, we were able to implement an SOP and bring a significant improvement in the management of PPH in the maternity ward.

**Keywords:** Postpartum haemorrhage, Standard operating procedure, Maternal mortality rate, Quality improvement project

## INTRODUCTION

### Problem description

India being a developing country has a great burden in providing adequate care in rural areas of the country. In Obstetric care, this is reflected by the poor Maternal mortality rate (MMR), when compared to developed countries. The maternal mortality ratio in developing countries in 2015 is 239 per 100 000 live births versus 12 per 100 000 live births in developed countries. Thus 99%

of all maternal deaths occur in developing countries with more than half of these deaths occur in sub-Saharan Africa and almost one third occur in South Asia.<sup>1</sup>

Various factors contribute to MMR. Postpartum haemorrhage (PPH) is the most common cause of maternal death, accounting for about 35% of all maternal deaths worldwide. WHO statistics suggest that 25% of maternal deaths are due to PPH.<sup>1</sup> PPH is defined as blood loss following labour of greater than 500 ml and said to be severe PPH if the blood loss is greater than 1000 ml.<sup>2</sup>

Incidence of PPH is reported as 2-4% after vaginal delivery and 6% after Caesarean section; with uterine atony being the cause in about 50% cases. Every year about 14 million women around the world suffer from PPH.<sup>1</sup> Sample registration system (SRS) released by Registrar General of India (RGI), Maternal Mortality Ratio (MMR) of India per 100,000 live births has declined to 113 in 2016-18 from 122 in 2015-17 and 130 in 2014-2016. This is due to the efforts of the Government of India through the National Health Mission, with implementation of guidelines and protocols in rural health centres.<sup>3</sup>

One such health centre is a Government General Hospital in a rural taluk in Bangalore. It is an establishment which caters to the medical needs of over 100,000 people, covering around 200 villages and 10 towns. It is a First Referral Unit (FRU). FRU introduced by the Government of India under the National Health Mission, provides comprehensive obstetric care services like caesarean section, new-born care, emergency care of sick children, full range of family planning services, safe abortion services treatment of STI/RTI availability of blood storage unit and referral transport services. This hospital has 24-hour emergency facilities, a daily multi-speciality outpatient service, fully functional labour rooms and operating theatres, and inpatient wards.

This hospital being an FRU is an Emergency Obstetric and New-born Care (EmONC) with a fully functioning labour room open 24-hours, and an equipped operating theatre to conduct caesarian sections. The obstetric ward has a capacity of 30 beds, which is under the supervision of the sole Obstetrician employed by the Hospital and monitored by a nurse over the 24 hours (three nurses working in shifts), with emergency calls taken by the duty doctor. Patients who cannot be managed in this setting are referred to a higher centre, including emergency cases requiring caesarian section during non-social hours.

The Obstetrician employed here noticed that there was no proper assessment of the compliance by the healthcare workers to the protocols of management of PPH. There was delay in the diagnosis of PPH, and recognition of severity. This resulted in delay in management and timely referral during non-social hours – i.e., when the Obstetrician was not available in the hospital. Moreover, many women developing PPH were found to have had preventable causes, which could have been avoided with regular Antenatal Care (ANC) visits.

With this observation, a group was formed to conduct a Quality Improvement Project (QIP) in the Hospital to reduce the number of PPH and ensure its appropriate management.

#### ***Objectives of the study***

To ensure adequate measures for the prevention and management of PPH by formulating a SOP as suggested

by the Government of India under the NHM in the Government General Hospital. The project aims to assess this by conducting Plan-Do-Study-Act (PDSA) cycles periodically.

#### **METHODS**

##### ***Study design***

This study is a Quality improvement project (QIP) which is a cross-sectional analysis.

##### ***Study analysis***

Data analysis using Plan-Do-Study-Act (PDSA) cycles.

##### ***Study place***

The QIP was done in the General Hospital in rural South India.

##### ***Duration of study***

The study took place over 3 months, from October to December 2020.

##### ***Inclusion criteria***

All Obstetric patients visiting the hospital for Antenatal care and emergency visits, including labour during the duration of the QIP.

##### ***Exclusion criteria***

No exclusion criteria.

##### ***Procedure***

Baseline data was collected from the hospital records. Relevant data was collected during each PDSA cycle periodically following the implementation of the SOP for reassessment.

##### ***Statistical analysis***

Statistical parameters were defined as indicators of the outcome of the assessment (Table 1).

##### ***Interventions***

Our interventions were to prepare a SOP and to establish it in the daily functioning of the labour ward. To do this we, the two interns posted in the hospital, formed a team supervised by the Obstetrician and the Administrative Medical Officer. While formulating the SOP, the guidance for the prevention and management of PPH suggested by the Government of India as a part of the NHM was used, while also referring to the WHO recommendations and the recent advances in maternal

care in resource poor settings.<sup>4,5</sup> These were modified to suit the setting of the hospital.

**Table 1: Defining the indicators of assessment.**

Indicator	Indicator measurement
<b>Percentage of patients with PPH</b>	No. of patients with PPH x 100/Total number of live births
<b>Percentage of patients diagnosed with PPH within the 1<sup>st</sup> hour</b>	Number of patients diagnosed with PPH in the 1 <sup>st</sup> hour x 100/Number of patients with PPH
<b>Percentage of patients with PPH treated appropriately</b>	Number of patients with PPH treated appropriately x 100/Number of patients with PPH
<b>Percentage of patients requiring referral due to PPH</b>	Number of patients with PPH requiring referral x 100/Number of patients with PPH

Guidelines were decided for the prevention and management of PPH. The measures were to be taken to reduce the preventable factors of PPH like anemia, by reinforcing the frequency and assessment during ANC visits. The SOP also included protocols on immediate post-partum care and observation, with steps for early diagnosis and assessing the need for appropriate referral. Guidelines for the management of PPH were also included.

Outcome indicators were noted down, and these were to be the standard analytic tool to assess the efficacy. To do this the baseline values for each of the indicators were assessed at the beginning of the first month and documented. The final outcome was to be compared to these values.

The interventions to be implemented were tested using PDSA cycles. Each cycle lasted for 15 days after which there was reassessment and collection of findings. These findings were used to map the subsequent PDSA cycle.

## RESULTS

### **PDSA cycle 1 (day 1 – 15)**

During the first PDSA cycle we aimed at educating the health care personnel in the hospital. This was planned to be done by two interventions – the first was to make them aware of the current problem and the need for improving the standard of care in the maternity ward in terms of preventing and managing PPH. The second was to introduce the staff to the SOP having the guidelines to help reduce the incidence of PPH and protocols for the management.

Under the supervision of the obstetrician, sessions were conducted in educating the healthcare workers about the gravity of the problem and the steps that could be taken to

reduce the number of patients with PPH through adequate ANC visits. The staff were also educated about the need to recognise PPH at the earliest and identify cases that need timely referral to higher centres. The need for early initiation of treatment was stressed, in the event of a patient with PPH. In the following sessions, the SOP were handed out to the staff, and the key points were explained. The steps to be taken to ensure adequate ANC assessment to prevent PPH, the surveillance post labour for early diagnosis and timely referral, and the steps of management of PPH were highlighted to the healthcare providers. Flowcharts with diagnostic criteria, referral criteria and steps of management were put up in the labour room and the emergency room.

During the first cycle, we objectively studied the understanding and the compliance to the newly implemented SOP by the healthcare workers. The understanding was assessed by conducting post session tests. The compliance was assessed by watchful monitoring of maternity ward work and emergency room and noting the number of personnel following the new change.

It was observed that 80% of the staff had sufficiently understood the changes to implemented and the gravity of the situation. But only 52% of the staff had started implementing the change in their work. To combat this, another set of teaching sessions were planned to be conducted.

### **PDSA cycle 2 (day 16 – 30)**

During the second cycle, we aimed to improve the methods of educating the personnel to get better results than the first cycle. The different approach implemented was to include interactive and practical sessions. The staff were given case scenarios and demonstrations of the steps in the SOP were done. They were also explained about the indicators that were aimed to be improved. After implementing this intervention, the staff was assessed again. On assessing them the second time, 94% of the workers were found to have sufficiently understood the change and 80% had effectively implemented the change in their practice. The long-term plan was to organise frequent sessions to reinforce the implemented change. These sessions were to be conducted every month.

### **PDSA cycle 3 (day 31 to 45)**

After ensuring that there was adequate compliance by the healthcare personnel to the implemented guideline, the team concentrated on ensuring that the interventions were resulting in meeting the target outcome. The indicators were assessed prospectively from the end of the 2nd PDSA cycle. After the assessment the outcomes were compared to the baseline values. The series of interventions resulted in an improvement in these factors. At the end of assessment, percentage of patients with PPH was 8% (an improvement from the baseline value of

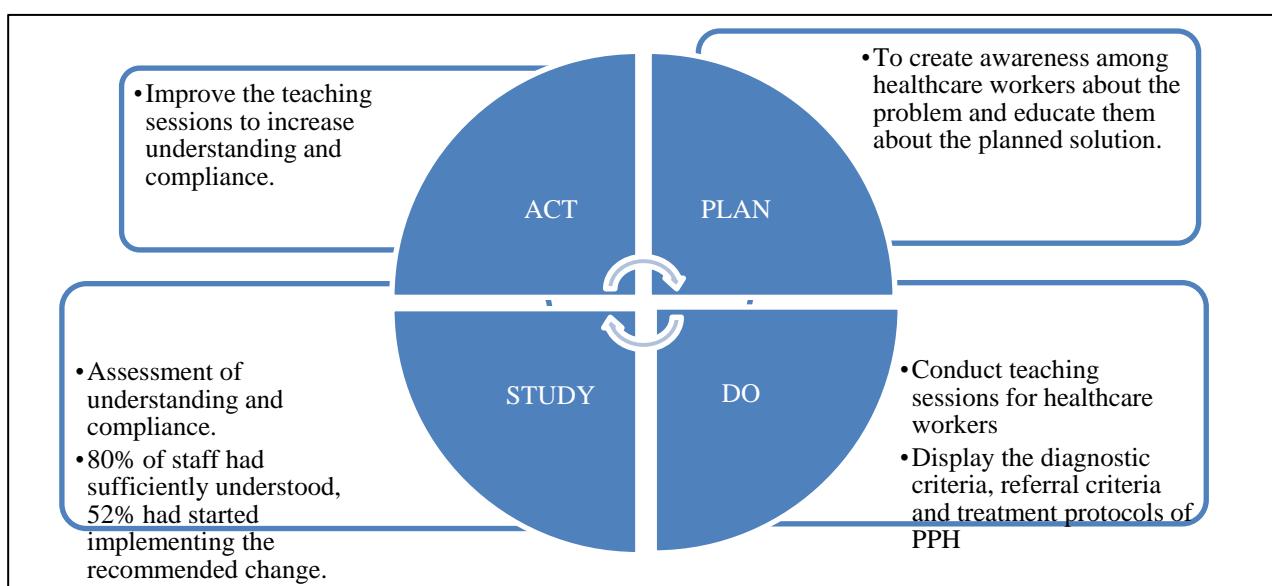
10%), percentage of patients diagnosed with PPH within the 1st hour was 40% (an improvement from the baseline value of 30%), percentage of patients with PPH treated appropriately was 80% (an improvement from the baseline value of 65%), and percentage of patients requiring referral due to PPH was 20% (an improvement from the baseline value of 30%). The next step of action was to concentrate on improving these indicators while continuing the implementation of changes.

#### **PDSA cycle 4 (day 46 – 60)**

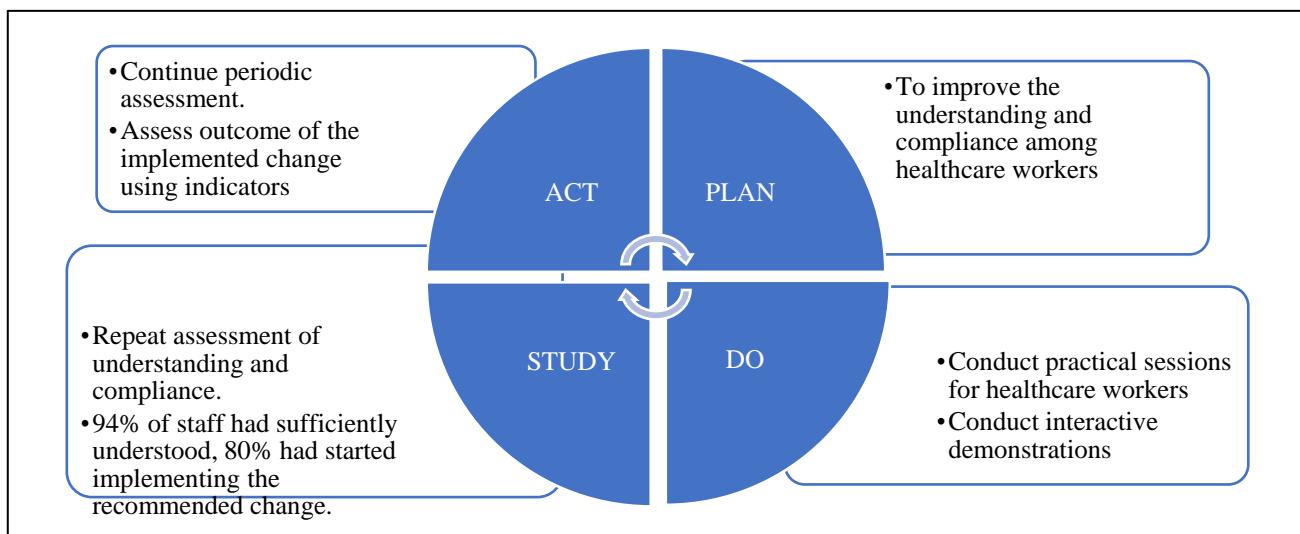
To further improve the outcome indicators, the Obstetrician conducted outreach sessions to the communities. These included poster presentations and interactive sessions to raise awareness among the common masses about the need for regular ANC visits so that the preventable causes of PPH could be recognised

early and managed. The need to arrange for blood donors towards the end of pregnancy was also highlighted. The social outreach workers in the community were also encouraged to help and educate the pregnant women in the community. The healthcare personnel also had a reinforcement of the objectives and the protocols, with more practical sessions.

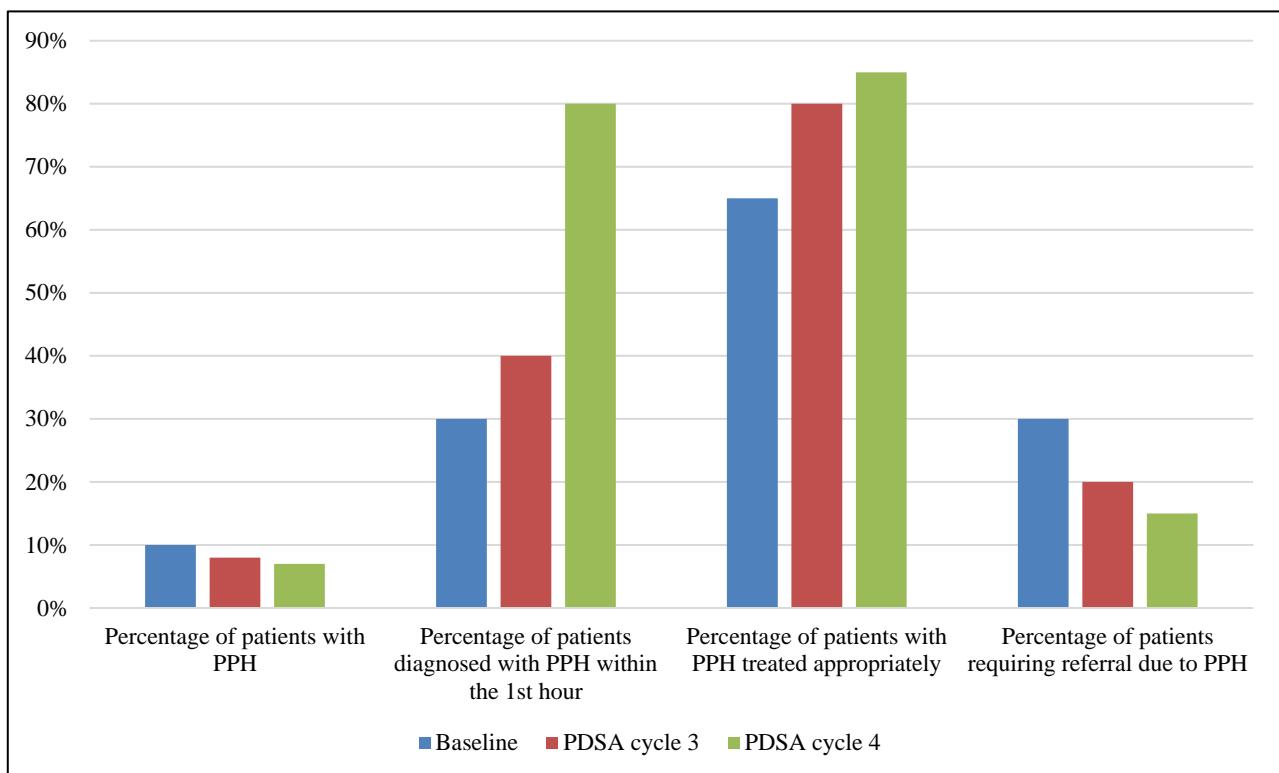
Following these interventions, the indicators were reassessed. At the end of the assessment percentage of patients with PPH was 7% (an improvement from the baseline value of 10%), percentage of patients diagnosed with PPH within the 1st hour was 80% (an improvement from the baseline value of 30%), percentage of patients with PPH treated appropriately was 85% (an improvement from the baseline value of 65%), and percentage of patients requiring referral due to PPH was 15% (an improvement from the baseline value of 30%).



**Figure 1: PDSA cycle 1.**



**Figure 2: PDSA cycle 2.**



**Figure 3: Comparison of indicators.**

There was significant improvement in the indicators since the implementation of the changes. Thus, at the end of 3 months the interventions showed satisfactory outcomes.

**Table 2: Indicators to assess outcomes at the end of PDSA cycle 3 and 4.**

Indicators	Baseline	PDSA cycle 3	PDSA cycle 4
Percentage of patients with PPH	10%	8%	7%
Percentage of patients diagnosed with PPH within the 1 <sup>st</sup> hour	30%	40%	80%
Percentage of patients with PPH treated appropriately	65%	80%	85%
Percentage of patients requiring referral due to PPH	30%	20%	15%

## DISCUSSION

### Summary

Having an SOP in the hospital for a specific complication makes the staff better prepared to face it, thus ensuring a better outcome. Having a Standard Operating Procedure is very beneficial to the quality improvement in the field

of health care.<sup>6</sup> With the aim to reduce the number of fatalities of PPH, the introduction of a standard set of guidelines for this cause was imperative. With this in mind, an SOP was drafted, referring to guidelines suggested by the government of India and WHO on management of PPH and steps to prevent it during pregnancy.<sup>4-6</sup> With its implementation the on call doctors and the nurses were thought to be better equipped to handle PPH during non-social hours and thus would not be in the need to consult the Obstetrician or refer the patient to a higher centre for cases that could be easily managed in the hospital, during those hours.

The hospital also lacked regular standardized assessment of the quality of care in the maternity ward and the labour room. The extent of the problem couldn't be objectively identified. A set of outcome indicators were defined. Baseline data for the indicators were recorded. The interventions were implemented through PDSA cycles, each cycle being 15 days. The first two PDSA cycles concentrated on the understanding and the compliance of the healthcare personnel to the implemented change. The subsequent two PDSA cycles were aimed to improve the outcome indicators from the baseline value.

While we aimed to concentrate on putting into action the implementation of the SOP in the daily functioning of the ward, we realised that a major factor was the education of the healthcare workers to understand the need for the change and observe it in practice. This was objectively assessed in the subsequent PDSA cycles.

## Interpretation

With the introduction of the change, Quality Improvement methodology was utilized, using PDSA cycles – with findings of each cycle being the cross section and baseline for the subsequent cycle. The first two cycles focused on the overall understanding and compliance to the newly introduced SOP. After the first intervention the understanding of the problem was seen in 80% of the workers and the compliance in 52% of the workers. Using this data, the next intervention aimed at improving these values and resulted in the understanding being 94% and compliance being 80%.

Upon implementing the SOP and providing the preliminary education, the next two PDSA cycles consisted of the interventions being tested methodically using outcome indicators defined in the beginning of the study. At the end of the PDSA cycle, the effectiveness of the intervention was objectively reflected by the value of the outcome indicator when compared to the baseline values. The indicators pointed to the weak points in the planned improvement, and thus more focus was given to those parameters in the subsequent cycles.

At the end of 3 months, Percentage of patients with PPH reduced by 3%, Percentage of patients diagnosed with PPH within the 1st hour increased by 50%, Percentage of patients with PPH treated appropriately increased by 20% and Percentage of patients requiring referral due to PPH decreased by 15%. Thus, at the end of 3 months there was significant improvement in the values of the outcome indicators.

## Strength of the study

This Quality Improvement Project helped introduce and implement an SOP to reduce the number of PPH and help manage it in a resource poor setting. There were setbacks during the study duration, but we were able to correct them using the QI methodology of PDSA cycles. We were able to achieve a significant improvement in the indicators of PPH through this project. This can be used by other hospitals working in similar settings for comparison. Since this follows the guidance suggested in the National Health Mission, it also helps in testing the effectiveness of their protocols.

## Limitations of the study

One of the main limitations of this project is that it is not a single fix. To ensure that these observed improvements are maintained in the long run, both the healthcare workers and the local community needs to be periodically re-educated. The indicators have to be measured at

regular intervals, so that the efficacy of the change is maintained, and any shortcomings could be identified. The project is for a duration of 3 months, and thus a watchful eye is required on its effect on the MMR over the year.

## CONCLUSION

Implementing a Standard Operating Procedure is very important vital for improving the quality of care provided in the hospital, especially one in a resource poor setting. We faced some challenges during our initial efforts of putting the SOP into action. But with the subsequent interventions and efforts we saw to it that the changes initiated caused a significant improvement in the indicators, and in extension the quality of care provided to help prevent PPH. There was satisfactory change in the way the hospital was functioning over the period of 3 months during which the quality improvement project was conducted.

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*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Institutional Ethics Committee*

## REFERENCES

1. Postpartum haemorrhage. National Health Portal Of India. Available at: <https://www.nhp.gov.in/disease/gynaecology-and-obstetrics/postpartum-haemorrhage>. Accessed on 24th March 2021.
2. Prendiville W, O'Connell M. Postpartum Hemorrhage – Vouch. 2006:18.
3. Reduction in Maternal Mortality Rate. Available at: [pib.gov.in/Pressreleaseshare.aspx?PRID=1656242](http://pib.gov.in/Pressreleaseshare.aspx?PRID=1656242). Accessed on 24th March 2021.
4. Available at: [https://www.nhm.gov.in/images/pdf/program-mes/maternal-health/guidelines/Guidance\\_Note\\_on\\_Prevention\\_&\\_Management\\_of\\_Postpartum\\_Haemorrhage.pdf](https://www.nhm.gov.in/images/pdf/program-mes/maternal-health/guidelines/Guidance_Note_on_Prevention_&_Management_of_Postpartum_Haemorrhage.pdf). Accessed on 26th March 2021.
5. Available at: [https://www.who.int/maternal\\_child\\_adolescent/documents/newsletter/mps\\_newsletter\\_issue4.pdf](https://www.who.int/maternal_child_adolescent/documents/newsletter/mps_newsletter_issue4.pdf). Accessed on 26th March 2021.
6. Amare G. Review Reviewing the values of a standard operating procedure. Ethiopian journal of health sciences. 2012;22(3).2):1-5.

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