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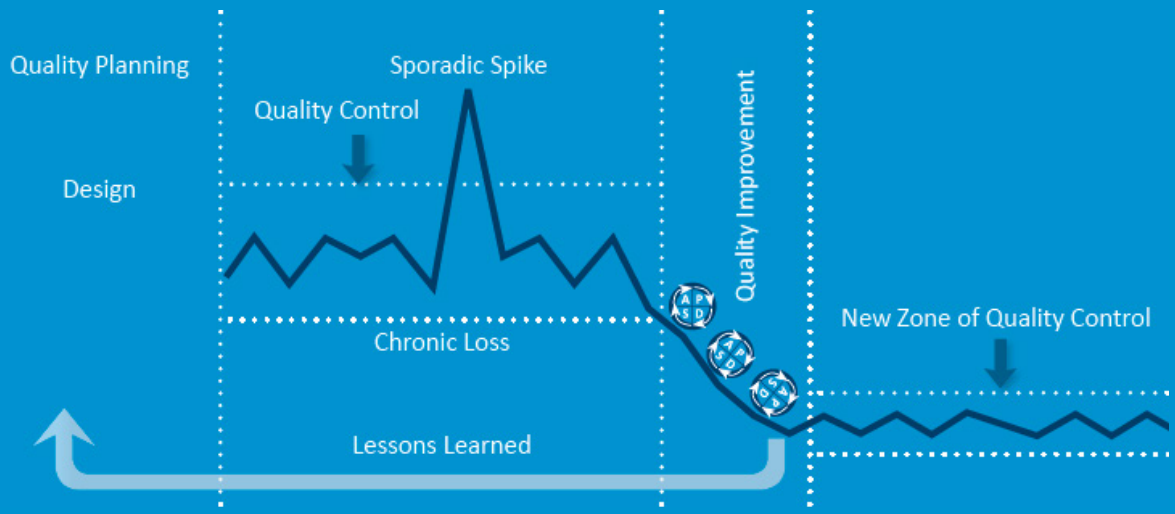
MINISTRY OF HEALTH - ETHIOPIA
የዜጎች ጤና ለሃገር ብልጽግና!
HEALTHIER CITIZENS FOR PROSPEROUS NATION!

National Healthcare Quality and Safety Bulletin

Integrated People-Centered Health Services: The Pathways for Better Clinical Outcomes and Confidence in the System



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Contents

Acknowledgments

The Ministry of Health is grateful to the national healthcare quality and safety technical working group members and their institutions for their contribution in the planning and preparation of the National Healthcare Quality summit.

The Ministry of Health would also like to appreciate and recognize the hard work of the core team for their hard work and effort they exert in review and selection quality improvement projects collected through call for abstract to materialize this bulletin.

Furthermore, the ministry is very grateful to the authors of the selected quality improvement projects, studies, and their affiliated organizations for sharing the information, innovation, and learnings.

Finally, the ministry would like to thank the UNICEF-Ethiopia Office for financial support in the printing of this Bulletin.

Forwards

In discussions about universal health coverage, often the essential element of access to healthcare overshadows the understanding that better health can only be achieved if accessed services are also of high quality. To improve health system performances, it's imperative for policymakers and important contributors at all levels that ensuring healthcare services are of good quality. During recent Health Sector Transformation plans the Ministry of Health has put the quality of care on center stage and working with regional health bureaus and development partners to implement improvement reforms for better clinical outcomes and patient/client experiences in Ethiopia. Different improvement reforms have been developed, introduced, and being implemented in the Ethiopian healthcare system over the last decades.

Over the years, Ethiopia has achieved substantial advances in the series of HSDP, where universal health coverage was given the priority to address the priority health problems of the country. Despite significant achievements in universal health coverage and recent small-scale quality improvement efforts in selected priority programs in recent years, yet large variation in services effective coverage and care outcomes persists both at primary and tertiary care facilities. These variations signal that more should be done to improve healthcare quality, in terms of quality planning, assurance, and improvement at all levels.

Through the National Healthcare Quality Bulletin, we aim to share and spread best experiences along with their interventions that were tested, implemented, and have shown improvement in their original sites and for possible adaptation in our health facilities. We believe that this type of learning diffusion will reach many more facilities and ultimately moves our healthcare quality improvement efforts towards reliable, high-quality care.

Hassen Mohammed Beshir (MD,MPH)

Director, Health Service Quality Directorate

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Maternal and Newborn Health Quality of Care initiative in the 14 learning district of Ethiopia. Implementation status and results.

Introduction:

Ethiopia has achieved substantial decline in maternal and under five mortality outcomes in the last subsequent years. Under-5 mortality declined from 166 deaths per 1000 live births in 2000 to 67 deaths per 1000 live births in 2016, representing a 60% decrease over a 16-year period [1]. Similarly, maternal mortality declined by 53%, from 871 per 100,000 live births in 2000 to 412 death per 100,000 live births in 2016. [1, 2].

Though overall under five mortalities reduced significantly, the proportion of deaths occur during the neonatal period were reducing at slower rate and the current burden of maternal mortality with 412 maternal deaths per 100,000 live births and neonatal mortality with 29 neonatal deaths per 1000 live births is still higher [2]. On the other hand, recent mini EDHS 2019 study revealed that, improved maternal health coverage, 74% of women received antenatal care from a skilled provider, 43% received four or more ANC visits and 48% of women delivered at a health facility. These findings indicated, improvement in maternal health coverage need to integrate health care quality to address the current persistent disparities and unmet need on maternal health care.

Cognizant to this, Ministry of Health of Ethiopia has prioritized maternal and newborn quality of care and begun to design and implement several Quality improvement initiatives.

Maternal quality of care has become the area of focus in the Ethiopian hospital reform through Hospital alliance for quality since January 2014. Moreover, as quality and equity became one of four pillars of the Health Sector Transformation Plan (HSTP), the 1st Ethiopian National health care quality strategy (2016-2020) was launched and MNCH quality of care identified as one top priority focus area of the strategy. These created an opportunity for Ethiopia to join the WHO led ***Global network to 'Improve Quality of Care for Mothers, Newborns and Children.*** The Network provides a platform for countries to ensure that quality of care becomes an integral part of health care delivery; it facilitates intercountry learning, knowledge sharing, and generation of local evidence and best practices.

To operationalize the NQS agenda of improving Quality of Care for Mothers, Newborns and Children, the Ministry of Health with its development partners has developed MNH quality of care Roadmap The Roadmap stipulates a goal of reducing institutional maternal and newborn deaths and stillbirths by 50% by 2020 and achieving a measureable improvement in user satisfaction with the care received.

The road map development were informed by gaps identified by the situational analysis conducted using the WHO MNH QOC analysis framework comprised of four strategic objectives of the framework: leadership, action, learning and accountability. Moreover, priority action under the four strategic objectives were identified based on the identified gaps including work plan detailing activities with budget.

Therefore, the Road map has four strategic objectives named as LALA: Leadership, Action, Accountability and Accountability.

- **Leadership:** Build and strengthen national institutions and mechanisms for improving quality of care in the health sector.
- **Action:** Accelerate and sustain implementation of quality of care improvements for mothers and newborns.
- **Learning:** Facilitate learning, share knowledge and generate evidence on quality of care.
- **Accountability:** Develop, strengthen and sustain institutions and mechanisms for accountability.

Implementation arrangement and progress

The Ministry of Health- Health service quality Directorate in collaboration of development partners established district based learning collaborative network and provided support on the implementation the MNH QoC roadmap packages. The initiatives implemented in selected 14 districts representing the agrarian, pastoralist and urban set ups in the country (3 - 5 learning health facilities per district with total of 48 learning health facilities consisting of 8 referral & general hospitals, 12 primary hospitals, and 28 health centers.), beginning in July 2018. The WHO MNH QoC Monitoring and Evaluation framework were also adopted and implemented to track implementation of the program and results that includes fifteen common core indicators measuring provision of care, experience of care and WaSH.

MNCH quality standards were developed based on the WHO standards included as one chapter in the Ethiopian Health sector transformation for quality guideline (HSTQ) and used to undertake clinical audit in the learning Hospitals.

Initially, a two days' workshop were organized to provide orientation to MNH and Quality program managers and focal in the respective eight Regional Health Bureaus, 14 learning districts and 48 learning health facilities on the MNH QOC initiative, the MNH QOC roadmap, the implementation package and monitoring framework.

Existing Health care Quality structures at National, sub national and Health facility levels were capacitated through providing basic and advance QI trainings. National QI coaching guide were also developed and two rounds of QI coaching training were provided to the established pool of QI coaches from Districts and lead Hospitals who provided quarterly on site QI coaching support to their respective learning health facilities. Besides, in collaboration with supporting partners. **(Transform PHC, Transform HDR, IHI, CHAI & WHO) who provide technical support to learning districts,** on-site support regular mentoring and coaching support provided to build clinical and QI skills of learning health facilities.

The Ministry of Health-Health service Quality Directorate provide direct financial support to learning sites (RHBs, Districts and health facilities) for need based capacity building ,learning sessions, annual summit and QI project implementation.

As part of the implementation package, Maternal and Perinatal death surveillance and response system (MPDSR) strengthening were one of the key areas of support. Accordingly, four rounds of MPDSR training were provided to MNH and QI staff in all learning health facilities, districts and RHBs. Besides, maternal deaths and death response in the 48 learning health facilities are regularly tracked and monitored and feedbacks provided to lower levels.

National coordination mechanism established through forming Maternal & newborn Health QoC technical working group (TWG) comprising relevant directorates from Ministry of Health and all partners working on maternal and new-born QoC and regular monthly meetings has been conducted to guide technical aspect of the implementation including overall monitoring of the initiative.

National MNH QoC learning network learning platforms were established and bi-annual learning collaborative sessions have been organized where all the 48 health facilities share best experience and lessons amongst themselves. Global MNH QoC summit were organized to exchange best experiences and lesson learnt among the network countries

As part of the regular MNH QoC monitoring, the 15 common core indicators, additional indicators from DHIS2 and National MPDSR data based were used for monitoring of process and outcomes and quarterly feedback were provided.

Major results and lessons:

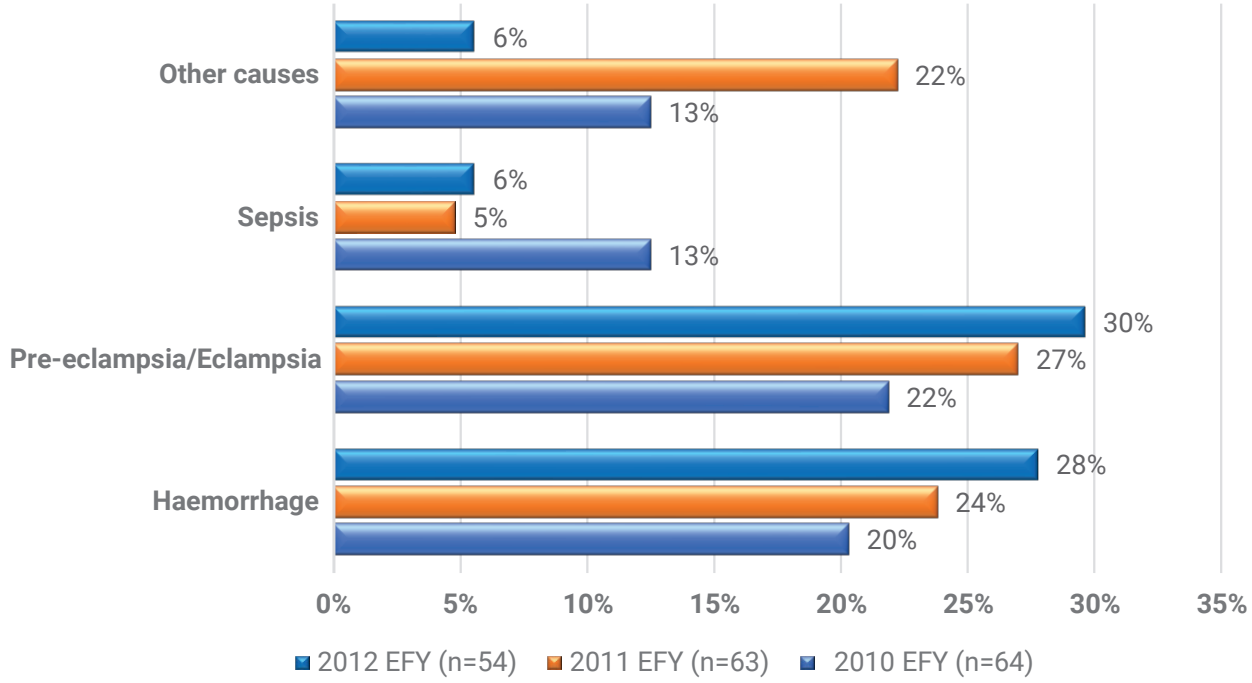
Three outcomes measures included in the MNH common core indicators reporting system which have been collected and reported by the 48 learning health facilities were used to assess the achievement of the network intended outcomes through comparing the 2nd year (2012 EFY)and 1st year (2011 EFY) results against the pre- implementation period or baseline year status (2010 EFY). The three outcome measures used for the assessment are institutional pre-discharge maternal mortality, institutional pre discharge neonatal deaths and stillbirth.

Institutional pre –discharge maternal deaths:

The institutional pre –discharge maternal deaths in the 48 learning health facilities during the follow up yeas period (2012 EFY and 2011 EFY) were 109 and 95 per 100,000 live births respectively. This indicated a decline in pre-discharge maternal mortality rate by 9.3% for 2012 EFY and 20.6% for 2011 EFY compared to the baseline period of 120 per 100,000 live births. On the other hand, the decline in pre-discharge maternal mortality rate is higher for primary Hospitals than Referral and General Hospitals. Compared to the 2013 EFY performance against the baseline period, primary Hospital pre- discharge maternal mortality rate has declined by 32.2% where as referral & General Hospitals has declined by 19.6%.

Though there is a limitation in causes of maternal deaths assignment due to the gaps in MDSR implementation, reported causes of deaths indicated, pre-eclampsia/eclampsia contributed the highest causes of deaths followed by Hemorrhage during the baseline and follow up period and the magnitude of contribution for the two caused of deaths increased from the baseline period. On the other hand, sepsis contribution as causes of death has declined from 13% to 5% (2011 EFY) and 6 %(in 2012).

Figure 1. Maternal caused of deaths, baseline, 2011 EFY - 2012 EFY



Institutional pre –discharge neonatal deaths:

The institutional pre –discharge neonatal deaths in the 48 learning health facilities during the follow up yeas period (2012 EFY and 2011 EFY) were 18.9 and 16.4 per 100,000 live births respectively. This indicated a decline in mortality rate by 19.5% for 2012 EFY and 7.5% for 2011 EFY compared to the baseline period of 20.4 per 100,000 live births. The burden of institutional pre- discharge neonatal mortality rate in referral and General Hospitals is higher than primary Hospitals and Health centers. In the 2013 EFY period, the decline in pre-discharge neonatal mortality rate in referral and General Hospitals is higher than the decline rate for primary Hospitals (24.1& and 0.1%).

Stillbirth rate:

The Stillbirth rate in the 48 learning health facilities during the follow up period were 24.4 per 1000 births in 2011 EFY and 26.6 per 1000 births in 2012 EFY , indicating a decline by 4.4% and increment by 5.3% respectively compared to the baseline year status of 25.3 per 1000 births.

Disaggregating stillbirth as fresh and macerated, fresh stillbirth has declined by 6.1% for 2011 EFY and 22.6% for 2012 EFY compared to the baseline year status whereas macerated stillbirth rate has increased by 7.3% in 2011 EFY and 80.3% for 2012 EFY. (Fig.XX)

Figure 2. stillbirth rate, total, fresh and macerated, 2010 EFY- 2012 EFY

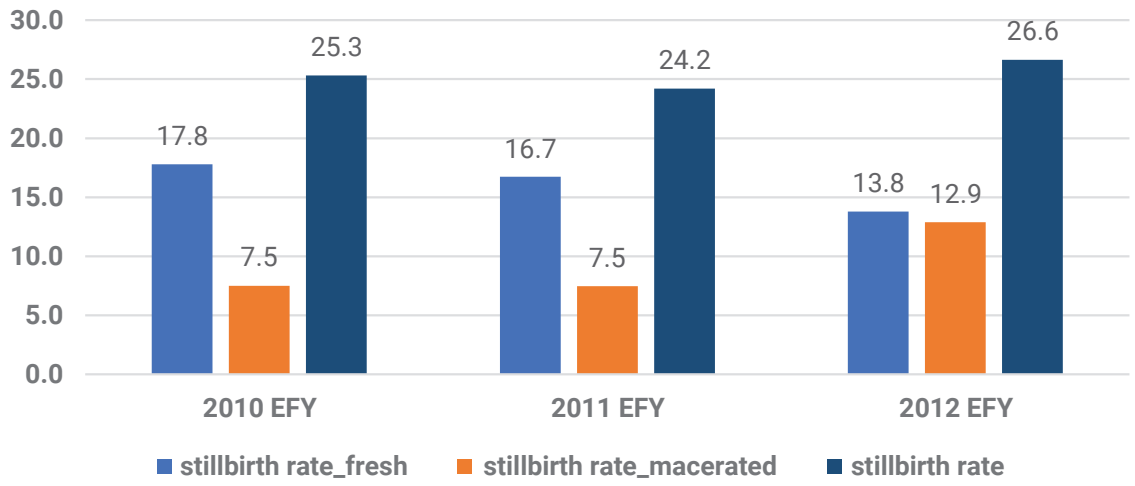


Table: 1: MNH QoC outcome measures result, 2010 EFY – 2012 EFY by Health facility type and Total.

	All Health facilities (N=48)			Referral & General Hospitals (N=8)			Primary Hospitals (N=12)				Health centers (N=28)		
Health facility type	2010 EFY	2011 EFY	2012 EFY	2010 EFY	2011 EFY	2012 EFY	2010 EFY	2011 EFY	2012 EFY	2013 EFY	2010 EFY	2011 EFY	2012 EFY
Number of maternal deaths	64	63	54	49	52	43	14	11	11	6	1	-	-
Number of neonatal deaths	1090	1095	932	952	946	789	121	134	140	58	17	15	3
Number of stillbirths - Fresh	975	991	793	815	796	615	117	163	137	63	43	32	41
number of stillbirths - Macerated	411	443	741	146	231	510	246	187	182	48	19	25	49
stillbirth rate fresh	17.8	16.7	13.8	25.6	23	17.9	10.3	11.9	10.6	11.5	3.7	2.9	4
stillbirth rate macerated	7.5	7.5	12.9	4.6	6.7	14.8	21.7	13.7	14.1	8.8	1.6	2.3	4.8
stillbirth rate	25.3	24.2	26.6	30.1	29.6	32.7	32	25.6	24.7	20.3	5.4	5.2	8.7
pre-discharge neonatal mortality rate	20.4	18.9	16.4	30.8	28	23.4	11	9.9	11	10.9	1.5	1.4	0.3
pre-discharge maternal mortality rate	120	109	95	159	154	128	127	82	86	113	9	0	0
Change in NMR		-7.5	-19.5		-9.3	-24		-9.3	-0.1			-5.2	-80.3
Change in MMR		-9.3	-20.6		-3.1	-19.6		-35.7	-32.1			-100	-100
Change in SBR		-4.4	5.3		-1.7	8.7		-20.1	-22.8			-2.7	62.5
Change in SBR Fresh		-6.1	-22.6		-10.2	-30		15.4	2.8			-21.3	6.8
Change in SBR Macerated		7.8	80.3		58.2	249.3		-24	-26			31.6	157.9

Conclusions:

Though the performance across the health facilities may be affected by the variation in the existing resources availability such as medical supplies, human resource and other structures, the early results of the MNH QoC network implementation has shown promising result with respect to reduction in institutional mortality outcomes. On the other hand, continued and sustained implementation of the quality improvement efforts may also be required for long term and sustained results.

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QUALITY IMPROVEMENT PROJECTS AND STUDIES SELECTED FOR LEARNING

Improve Efficiency of Medical Supplies in Maternity Pharmacy

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Abstract

Background: Based on Ethiopian Health Account 2016/17, 72 Billion ETB is expensed on the health sector, of which donors' contribution reaches 35%, and out-of-pocket expenses 31%. 51% of the total expense is used for prevention and treatment of infectious disease and 8% for reproductive health. Medical supplies used for labor and delivery services are provided to mothers for free of out-of-pocket charge, but it incurs costs to the country to purchase, transport, and distribute those items.

Methods: Model for improvement is used to set our AIM and measurements like Monthly delivery data for 2011 and 2012 EFY comparable 10 months (Hamle-Miyaziya) from HMIS report and total monthly deliveries and the total monthly CS delivery report from the HMIS.

Interventions: We printed a special prescription paper for the unit, and it is kept on a single individual who will prevent inappropriate access to other departments. Porter is assigned to facilitate transactions from the pharmacy and improve the shelving of medical supplies. We conducted a group and individual discussion with medical interns, midwives, and physicians in the department about the project goal and change ideas. Intermittent embargo in the prescription of items was made when they are available in abundant quantity on the labor and delivery room shelves. The sense of scarcity created among health professionals also enabled them to use the items they prescribed carefully.

The results: There was a total of 7298 total deliveries in the 2012 FY first 10 months (Hamle 2011-Miyaziya 2012). On average 730 deliveries are attended each month. When compared with the 2011 FY similar 10 months, there is a 19 % increase in the number of total deliveries. The number of total CS deliveries also increased by 42%. The CS rate increased to 19.6% in 2012 FY from 16.4% in 2011 FY. In 2012 FY % of patients who get 100% of prescribed medication increased to 82% when compared to 74% in 2011 FY. Grossly ETB 2.8 million is expensed in 2012 FY first 10 months (Hamle-Miyaziya). This consumption is smaller than previous FY consumption by ETB 199,313.9. The average monthly expense also decreased from ETB 292,623.40 in 2011 FY to ETB 264,225.53 in 2012 FY.

Conclusion: Intervention from the project resulted in improvement in average per mother expense- 23.3% decrease from 2011 FY, the difference between calculated and actual total monthly expense-53. 28% decrease from 2011 FY, and difference between actual and calculated per mother expense- 60.2% decrease from 2011 FY.

If the QI project intervention were not implemented and the 2011 FY consumption trend continues, in 2012 FY 10 months we were expected to consume ETB 3.52 million. But we consumed ETB 2.81 million and were able to save ETB 704,884.74. The result is expected to be more than this if the current inflation rate was considered.

Key words: VD, CS, Prescribed versus expensed medication, inflation rate

Introduction

Ethiopia, despite showing good economic growth successes, shows poor performance on macroeconomic indicators. Based on an IMF report, we rank 172 out of 192 world countries in GDP per capita. We have a negative trade balance that the value of our imports is greater than the value of our exports. Our health care expenditure is 4.2% of our GDP, below the 5% expected average for low-income countries. Based on Ethiopian Health Account 2016/17, ETB 72 Billion is expensed on the health sector. While donors financed 35% of the total health expenditure, 31% is covered by out-of-pocket expenses. 51% of the total expense is used for prevention and treatment of infectious disease and 8% for reproductive health.

Medical supplies used for labor and delivery services are provided to mothers for free of out-of-pocket charge. But it is a foolish assumption to consider it as free at all. The institution and our country incur costs to purchase, transport and distribute those items. It also has an opportunity cost of inhibiting us to spend on other areas. Even if all items are donated for free, it costs our country to unnecessary commitment to donors- as witnessed in GERD negotiation.

Efficient use of resources or preventing wastage of supplies is not similar to saving. Saving will imply reducing our current essential consumption for the sake of using in the future. But when we prevent waste, we are not reducing for our important consumption but prevent inappropriate use. This is the basic idea of the project.

The maternity, pharmacy in our hospital provides individually used medical supplies (IV fluids, medications, sterile gloves, syringes, IV cannula…) for pregnant and laboring mothers free of charge. Other items (gauzes, plasters, examination gloves, emergency drugs) are accessed separately from the hospital's store by the department. Thus, the QI project baseline assessment, current measurements and efforts are targeted at those items that are obtained from the maternity pharmacy.

Problem description

Is there really wastage of medical supplies?

There is waste of medical supplies in labor and delivery unit. Based on a baseline assessment on Hamle 2011, 43% of our monthly total expense are above our calculated expense. This sums up to ETB 1.9 Million annually and has an opportunity cost of additional 600 vaginal deliveries monthly or 6 additional portable ultrasounds.

In addition to our baseline assessment, the following findings from observations and focused group discussion showed us there is wastage or misuse of medical supplies in our labor and delivery unit.

In what we called "examination glove paradox", despite our effort to nearly double the amount of examination gloves we use in the department, we were unable to solve the problem. The examination glove was increased by 75% while there was only 25% increase in our delivery volume.

We also developed a scatter plot and linear regression equation to relate the monthly total delivery and total CS delivery with our monthly total expenses. Ideally the major determinant of total expense is expected to be the delivery volume but, in our case, both variables stated above are not related with our total monthly expense. This unpredictable nature of consumption revealed hidden wastage in our use.

How the wastage occurs?

We conducted observations and group discussions with health professionals in the department to determine possible causes for such wastage. We found that problems during prescribing, dispensing, shelving, and storing, and utilization of items contributes to the wastage of medical supplies in our unit.

Even though some of the underlying problems arise from administrative issues, most problems are related to health professional's subconscious behaviors. For example, most health professionals subconsciously request a set of items that they do not use them. Less frequently used items are requested and remain on the shelf for more than months.

Description of performance gap: For the past nine months, we had an increased number of pre-term neonatal mortality. For this gap, we identified some main root causes by using a fishbone diagram as described below.

Methods

The quality improvement team used a model for improvement to reduce neonatal death in preterm infants.

Interventions: Assigning trained professionals on essential newborn care to help in identifying and managing high-risk neonates, Conducting regular death audits- to identify gaps and develop an action plan on adherence to standard treatment guidelines and completeness of inpatient documentation, infection prevention equipment's were availed and used appropriately with cleaning campaign cascaded biweekly, Health education-for the mothers on the importance of exclusive breastfeeding, to seek health care early if danger signs developed, practical demonstration of KMC, Monitoring of documentation which was performed by the team on the day to day activity, and renovation of NICU ward.

The details of the Change ideas for the success of the Project are depicted in the table below.

Table 1: Root causes and tested change ideas

Root causes	Tested change ideas
The underlying problem arises from health professional's practices.	■ We printed a special prescription paper for the unit, and it is kept on a single individual who will prevent inappropriate access to other departments. ■ Porter is assigned to facilitate transactions from the pharmacy and improve the shelving of medical supplies. ■ conducted a group and individual discussion with medical interns, midwives, and physicians in the department about the project goal and change ideas. ■ Intermittent embargo in the prescription of items was made when they are available in abundant quantity on the labor and delivery room shelves. ■ The sense of scarcity created among health professionals also enabled them to use the items they prescribed carefully.

Study of the interventions repeated PDSA cycles were used for testing the change ideas one at a time. Each process was documented on the data collection tool for routine QI team meetings and improvement actions were taken.

The progress of the project was monitored every 2 weeks and the run chart was used to analyze the data collected over time with annotation of the interventions.

Measures

Outcome measure:

- Total number of SVD om Monthly
- Total monthly CS deliveries

Process measures:

- Average total expense per mother- equals the average total monthly expense divided by total monthly delivery.
- Calculated/estimated monthly expense = ETB 270* total monthly delivery + ETB 350* total monthly CS delivery
- Calculated monthly expense as a percentage of total expense= calculated monthly expense *100/ total monthly expense
- Calculated average per mother expense = calculated monthly expense/ total monthly delivery

Results

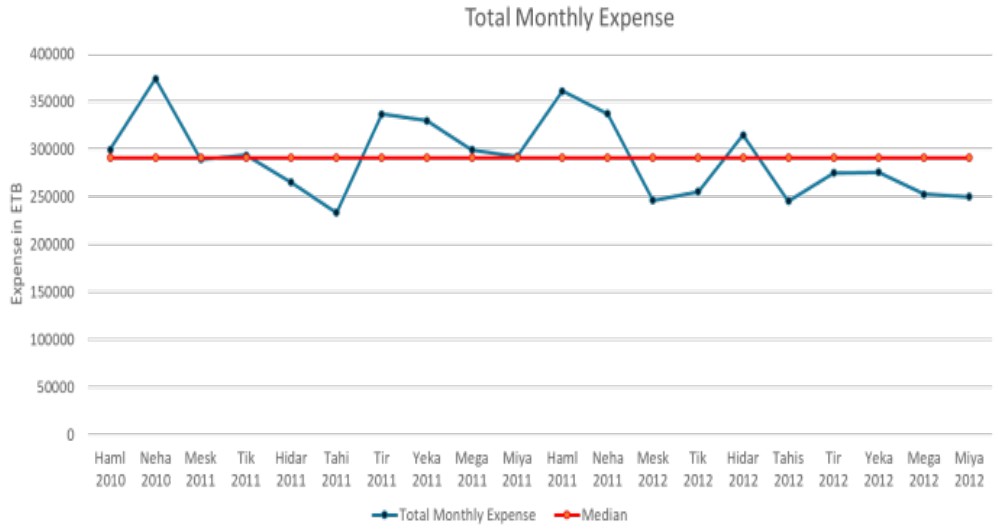
Since the QI project is implemented starting from Meskerem 2012, comparison of indicators involves 08 comparable months (from Meskerem to Miyaziya) of 2011 and 2012 EFY. Run chart and independent sample t-tests were used to assess the statistical significance of the change that result**s** from the project interventions.

The QI project has improved the number of total deliveries a total of 7298 total deliveries (2012 FY) by a 19% during the first 10 months (April 2019-Jan 2020) (Hamle 2011 EFY-Miaziya 2012EFY as compared with the 2011 FY similar 10 months, The QI has also the number of total CS deliveries increased by 42%. The CS rate increased to 19.6% in 2012 FY from 16.4% in 2011 FY.

Average monthly expense

The average monthly expense has decreased by 9.7% from 2011 FY and by 27% from the baseline. But this change is not statistically significant in that there is no improvement in the average total monthly expense. The increased delivery volume in the 2012 FY can explain the insignificant result we obtained in the gross total monthly expenses.

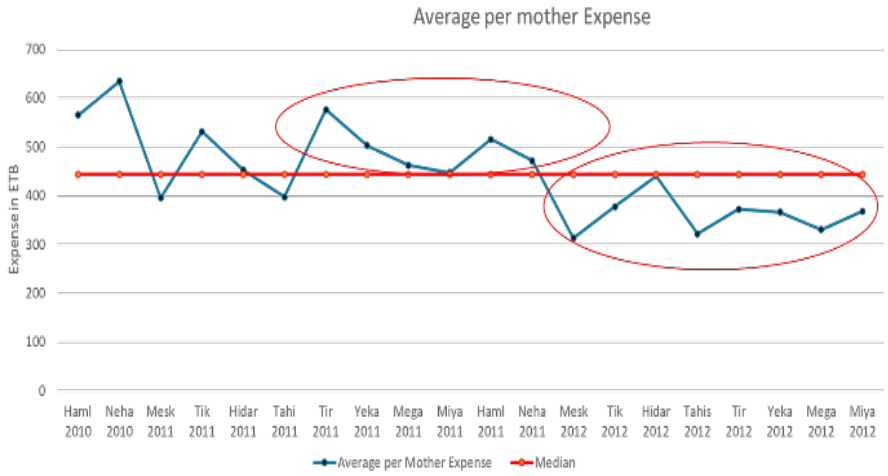
Figure 1. Run chart of monthly total expense



Average total expense per mother

The average total expense per mother has decreased by 23.3% from 2011 FY and 29.9% from the baseline. This change is statistically significant that we can declare there is an improvement in the average per mother expense. Despite the increase in delivery volume, the decrease in total monthly expense could explain the improvement that occurred in the average total expense per mother. There is a mean difference of ETB 206.21 in the average per mother expense in 2012 compared with 2011. (p-0.000,95% CI-126.522,285.89)

Figure 2. Run chart of average total expense per mother per month- it shows the shift

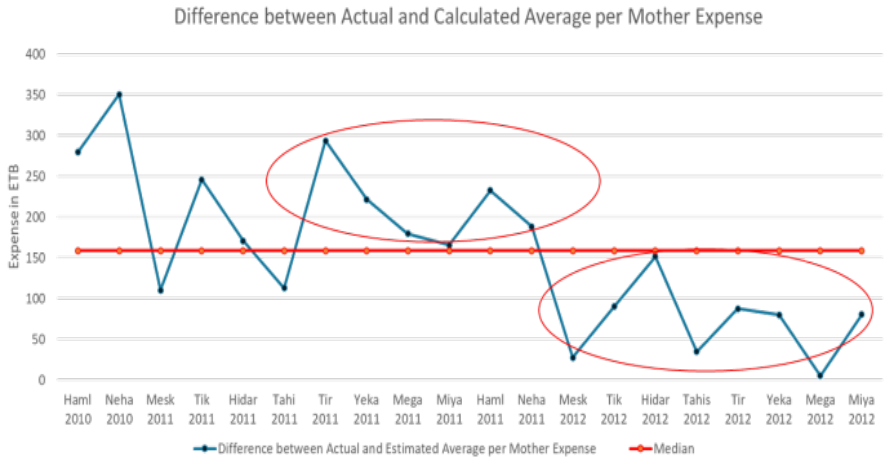


Differences between calculated and actual total monthly expense

This indicator is used to show our extra consumption. There is a 66.8% decrease in this indicator from the baseline and a 53.3% decrease from 2011 FY. The calculated expense as a percentage of total expenditure has increased from 60% in 2011 FY to 80%. This shows we are approaching a predictable consumption pattern.

The result we obtained in the difference between actual and calculated total monthly expense showed a statistically significant change and improvement (to few runs and shift). There mean difference in the difference between calculated and actual monthly expense is 93,482.39 (p-value:0.00, 95% CI-49,443.06,137,521.71)

Figure 3. Difference between actual and calculated monthly total expense- shows to few runs and shifts

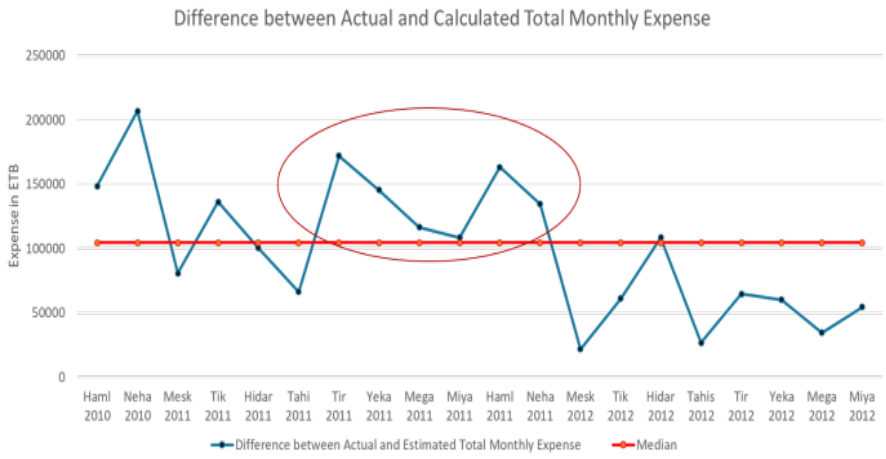


Differences between actual and calculated per mother expenses

The difference between actual and calculated per mother expenses in 2012 FY has decreased by 60.2% and 67.8% from 2011 FY and the baseline, respectively. This implies ideally in 2012 FY ETB 74.75 extra expense is consumed for each mother, which was ETB 187.71 in 2011 FY.

There is a mean difference of 205.98 less in 2012 compared in 2011 (p-value: 0.00,95% CI-126.03,285.93). The change in the difference between actual and calculated average per mother expense shows statistically significant change (too few runs and shifts) that we can conclude there is improvement in the indicator.

Figure 4. Difference between actual and calculated per mother expense. it shows to few runs and shifts



Conclusions

ntervention from the project resulted in improvement in the following indicators: average per mother expense- 23.3% decrease from 2011 FY, the difference between calculated and actual total monthly expense-53.28% decrease from 2011 FY, and the difference between actual and calculated per mother expense- 60.2% decrease from 2011 FY.

If the QI project intervention were not implemented and the 2011 FY consumption trend continues, in 2012 FY 10 months we were expected to consume ETB 3.52 million. But we consumed ETB 2.81 million and were able to save ETB 704,884.74. The result is expected to be more than this if the current inflation rate was considered. Despite the project resulted in improvement in consumption of medical supplies in our labor and delivery unit, ETB 54,074.43 (20% of total monthly expense) is over consumed each month. And around ETB 74.75 is extra consumed in each mother.

Lesson learned and Recommendations

Despite improvement, 20% of prescribed medication is used inappropriately. Thus, this should be reduced in the second phase of the project implementation through

- Implementing a prescription policy that prevents unnecessary request for less frequently used medical items
- Improve shelving and storage of medical supplies in the unit
- Increasing the availability of reusable and permanent equipment such as IV Stands, CTG Belts, Tourniquets
- Providing training to change practices in the use of medical supplies to health professionals
- Scale-up and sustainability plan should be prepared to ensure its permanence
- The outcome of the project and its assessment showed us there is misuse in use of medical supplies and with minimal intervention significant improvement can results. So, the project should be scaled up and spread to other departments.

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Increasing Effective ANC Coverage Linked to Quality Improvement Interventions, Ab'ala Primary Health Catchment, Afar Region, Ethiopia

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Abstract

Background: ANC is one of the pillars of safe motherhood. However, effective ANC coverage is low in Ethiopia where only 43% had four or more ANC visits while only 11% received iron tablets for the recommended 90 days (mini-EDHS 2019). Afar region being one of the developing regions has even lower coverage than the national average of 31%. The USAID Transform Health in Developing Regions (T-HDR) project supports the four developing regions to improve the quality of health services using the model for improvement. We presented the quality improvement project in Ab'ala woreda tested successfully in increasing effective ANC coverage.

Methods: After analyzing the root causes for the low effective ANC-4 coverage, the quality improvement team came up with the following interventions which they tested as of March 2019.

Interventions: the following route causes analysis the following changes were made including, dedicating a backup register to enable retrieval of lost MRN cards, post counseling aid at the ANC room, print referral forms and ensure referred women are seen at the hospital, assign liaison officers at the health center who follow and ensure that referred women are seen at the hospital, provide portable ultrasound and train healthcare providers on its use, strengthen early pregnancy detection by HEWs and social mobilization committee and strengthen the pregnant women conference in each kebele

Results: HEWs and Social Mobilization Committee identified 134 pregnant women early in pregnancy and linked them with the health facilities for ANC service. This led to the increase in the ANC 4 coverage from 37% to 65% by the end of Dec 2019. All the pregnant women received the full package of ANC. Six of them tested positive for hepatitis B virus and were referred to the hospital for further investigation including viral load while 53 pregnant women were referred for ultrasound service.

Conclusion: Antenatal care using ultrasound for a higher quality of care and early pregnancy identification for early ANC uptake led to increased effective ANC 4 coverage. Quality Improvement initiatives with strong demand creation and improved service delivery led to achieving the intended result.

Key words: Antenatal care, quality improvement, developing regional state, Afar

Background

Antenatal care (ANC) is an important essential service that helps to reduce maternal mortality through early maternal risk identification and referral linkages to a higher level of care. It also serves as an important platform to provide supplements such as iron and vaccinate against tetanus. However, effective ANC coverage is low in Ethiopia where only 43% had four or more ANC visits while only 11% received iron tablets for the recommended 90 days (mini-EDHS 2019). Afar region being one of the developing regions has even lower coverage than the national average (31%, mini-EDHS 2019).

Ab'ala is one of the woredas in Afar region within Zone 2. It has four health centers and twelve health posts and the Ab'ala primary hospital that serves the zone is found within the woreda. The ANC 4 coverage of the woreda is 36.7% (Zonal report, 2011 E.C).

The USAID Transform Health in Developing Regions (T-HDR) project supports primary health care across the four developing regions since May 2017. As part of this support, the project provides capacity building and coaching to quality improvement teams (QIT) in the health facilities to enable them to improve maternal newborn care using quality improvement approaches. In this report, we presented the quality improvement (QI) project tested successfully in Ab'ala primary health catchment in increasing effective ANC coverage.

Problem Root Cause Analysis

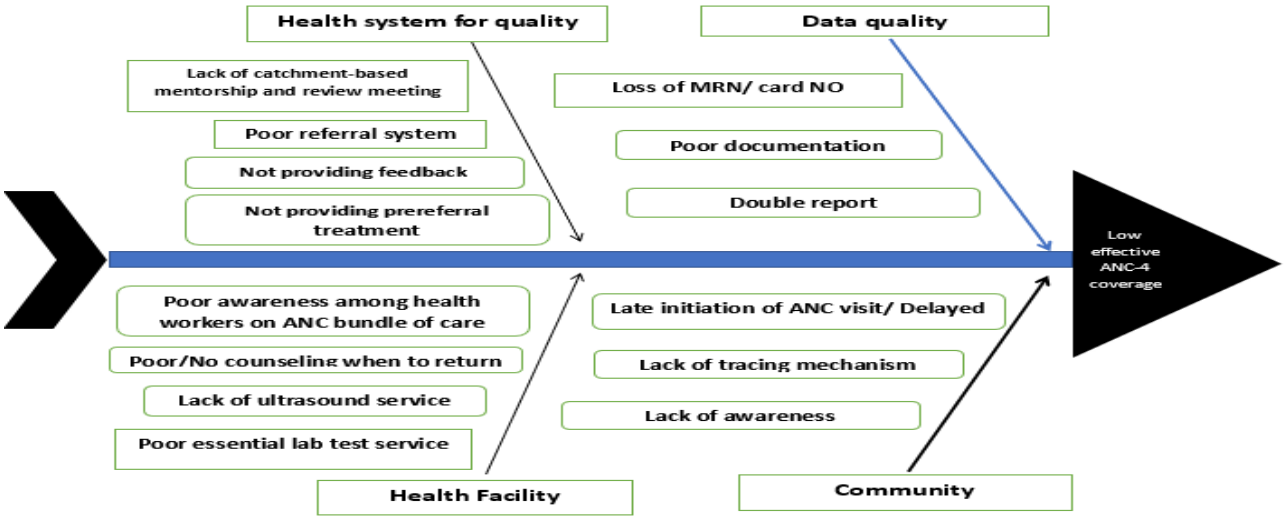


Figure 1. Fishbone analysis on the low effective ANC-4 coverage

Identified problems	Proposed solutions/change ideas
Loss of medical record number (MRN)	Dedicating a back-up register to enable retrieval of lost MRN cards
No standardized counselling	Post counselling aid at the ANC room
No standardized referral mechanism among the catchment facilities and Ab'ala primary hospital	Print referral forms and ensure referred women are seen at the hospital
	Assign liaison officers at the health center who follow and ensure that referred women are seen at the hospital
No ultrasound service during ANC	Provide portable ultrasound and train healthcare providers on its use
Most pregnant women come for first ANC late in pregnancy	Strengthen early pregnancy detection by HEWs and social mobilization committee
	strengthen the pregnant women conference in each kebele

Problem Prioritized and Changes Made

Aim: QI team aim to increase effective ANC 4 coverage from 36.7% to 65% from March 2019 to Dec 2019 in Ab'ala woreda.

Method

The QIT used model for improvement to increase effective ANC coverage in Ab'ala woreda. As part of the intervention, USAID T-HDR provided training and orientation on QI approach and on ANC bundle of care to frontline health providers.

The QIT in the health centers of Ab'ala dedicated a back-up registration book to enable retrieval of lost medical record number (MRN) cards, that would allow mothers to continue their ANC follow up smoothly. To improve provision of effective counseling and tackle the lost-to-follow-up, counseling aid is posted for health workers during ANC service provision. To improve the quality of care, ultrasound service is now included to be provided by trained health workers at Ab'ala primary hospital. The hospital also provided clinical mentorship to the health centers.

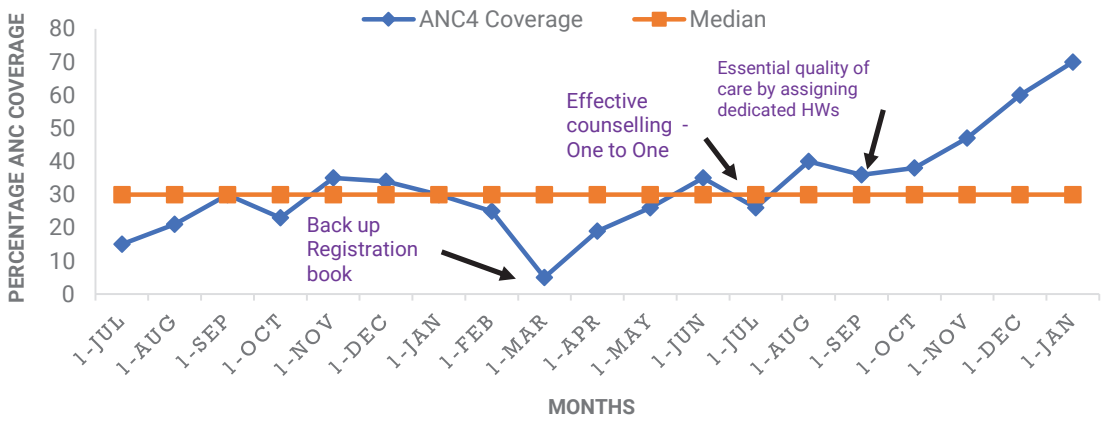
To strengthen the referral and linkage between health facilities, the QIT established a protocol for referral system and oriented the respective health facilities on the use of the referral formats. Orientation on the use of the referral form was provided and the forms were distributed to health facilities. Liaison officer is assigned at each health center to communicate and follow-up with Ab'ala primary hospital liaison office. Health posts provide basic ANC package including iron folate supplements as well as HIV and malaria testing. The health extension workers (HEWs) then linked identified pregnant women to the health centers for blood group & Rh, U/A, Hgb, Hepatitis B antigen and RPR tests. Besides, health centers referred mothers who needed further investigation and ultrasound services to Ab'ala primary hospital. Besides, the quarterly held review meetings among the health facilities in Ab'ala started to be used to tackle challenges related to referral, monitor their performance, and give feedback to each health facility.

The health centers in collaboration with the catchment health posts initiated pregnant women conference (PWC) at the catchment health posts. The PWC targeted women who are pregnant and helped to identify newly pregnant women at early gestational age (GA); within 13-16 weeks of pregnancy. Furthermore, HEWs provided information on the advantages of early disclosure of pregnancy for ANC services.

The project conducted onsite coaching on QI and provided close follow-up to improve ANC-4 service provision. The four health centers in Ab'ala received onsite support and follow-up visit on monthly basis from June 2019 to Dec 2019. This helped to ensure that the planned PWC are held at each level on monthly basis.

Results: A total of 134 pregnant women were identified before 16 weeks of GA and registered from each Kebele through the HEWs and Social Mobilization Committee. The identified pregnant women were linked with ANC service which contributed to increase ANC 4 coverage from 36.7% to 65% by the end of Dec 2019. All of these pregnant women (134) received the full packages of ANC including iron folate, malaria screening / testing, essential lab tests such as VDRL, Hgb, HIV test, blood group, and RH. Six of them tested positive for hepatitis B virus and were referred to the hospital for further investigation including viral load. Fifty-three pregnant women were referred with a standard referral form to the hospital where they received ultrasound service.

Figure 2. Percentage of ANC4 Coverage Ab'ala Primary Health Catchment, Afar Region, Ethiopia



Conclusion: Antenatal care using ultrasound for higher quality of care and early pregnancy identification for early ANC uptake contributed to increase effective ANC-4 coverage which may ultimately lead to increased facility delivery. Strengthening the referral linkage led to improved ANC performance where high-risk mothers who needed higher level of care could be identified and linked with the service. QI initiative with strong demand creation, referral system and improved service delivery component led to increased effective ANC-4 coverage. Currently, the health facility QITs adapted these interventions and continued tracking the performance using Run chart.

The Role of Quality Improvement Initiatives Supported by Growth Through Nutrition Activity to Improve Quality of Nutrition Services at Primary Healthcare Units

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Abstract

Introduction: Growth through Nutrition (GtN), a 5-year USAID Feed the Future nutrition project in Ethiopia, has been providing technical support for quality improvement on nutrition interventions within Primary Health Care Units (PHCU), ensuring availability of nutrition commodities, and data use for evidence-based decision-making processes for program refinement. This study intended to assess the role of quality improvement initiatives in improving nutrition services at PHCU level and identify challenges and facilitators of implementation to facilitate learning.

Methods: The study employed a cross sectional study supplemented by secondary analyses of QI project data. Sample size was determined using LQAS technique. The sample included 22 randomly selected PHCUs implementing quality improvement under the support of the project in Amhara, Oromia, SNNP, and Tigray regions of Ethiopia. Quantitative data was obtained primarily by reviewing quality improvement documents. Qualitative data was collected through key informant interviews and focus group discussions at health post (HP), health center (HC), and Woreda Health Office levels. STATA version 14 and OpenCode Qualitative Data Management Software were used to assist in quantitative and qualitative data management/analyses, respectively.

Results: All study PHCUs received training from the project for their technical staff. All study HCs and 85.7% of HPs have established QI teams. At least one QI team meeting during the one-month period preceding data collection was reported by 31.8% of HCs and 28.6% of HPs. Model for Improvement (MFI) and Kaizen's 5 S were implemented. Findings showed that evidence of effectiveness was found for 35 (64.8%) of the QI projects at HCs and 3 (20%) of them from HPs. Aggregate data showed that 14 of the HCs have improved quality of care through MFI. Implementation was facilitated where there was strong QI structure, support from supervisors, strong capacity for service delivery, and when the models were perceived as simple to implement. On the other hand, barriers for implementation were linked to limited ownership, focus on reportable output indicators, gaps in QI technical capacity, need for interventions beyond scope of control, inadequate support, and unfavorable contextual factors.

Conclusion: Quality improvement models have been effectively introduced in project supported PHCUs. Institutionalization is however in its early stage. While Kaizen was implemented in both HC and HP settings, implementation of MFI has been mostly limited to HCs. MFI projects in HCs were in general effective in improving targeted nutrition interventions; however, there were several ineffective projects suggesting gaps in root cause analyses and intervention development among HC level QI teams and inadequate capacity at HP level. Continued support is needed to ensure sustainable implementation of QI processes in target HCs and HPs. Linking processes of Kaizen with MFI and developing simplified approach for implementation of MFI at HP level should be priorities for further adaptations of the models in the future.

Introduction

Ethiopia has made great strides in improving health and nutrition indicators for its population over the past two decades. These changes contributed to noticeable reduction in childhood mortality (1-3). Despite remarkable improvements, rates of childhood mortality, morbidity, and malnutrition are still unacceptably very high (3-6). According to results of the 2019 Ethiopia Mini-Demographic and Health Survey in a cohort of 1000 live births, 55 would die before their fifth birthday; 43 would die during their first birthday; and 30 would die during their neonatal period (3). Malnutrition, particularly undernutrition, is known to contribute for up to 45% of deaths among under-five children in low- and middle-income countries (7).

The efforts of the health sector to improve quality of care are demonstrated through the adoption of a national healthcare quality strategy (8) and the Ethiopian Hospitals Management Initiative (EHMI) that subsequently progressed into the Ethiopian Hospitals Reform Implementation Guideline (EHRIG) and subsequently the Ethiopian Health Center Reform Implementation Guideline (EHCRIG) (9, 10). The Ethiopian National Health Care Quality Strategy (8) has outlined a clear roadmap for addressing key quality challenges and for accelerating the improvement of health care quality. These initiatives have been instrumental in the implementation of the Health Sector Transformation Plan (HSTP) (11).

Lessons from implementation of the two quality improvement models in different parts of Ethiopia at different levels of the health system suggested that quality improvement activities can lead to better health outcomes by improving health facility management, addressing barriers to service utilization, improving comprehensiveness of care, and minimizing missed opportunities for service provision (12). A study on application of quality improvement models at service delivery points close to communities (including the Health Extension Program of Ethiopia) also suggested that quality improvement processes support improvement of health outcomes (13).

Growth through Nutrition, a 5-year USAID Feed the Future nutrition project in Ethiopia, has been providing technical and financial support for implementing this approach, from national to primary health care unit (PHCU) levels, particularly in the areas of quality improvement, nutrition commodities, and data use for evidence-based decision-making processes for

program refinement. The quality improvement component of the project supported PHCUs including health centers and health posts to initiate and maintain quality improvement processes. The two models recommended in the National Quality Strategy (8), Kaizen and Model for Improvement, have been the models that the project's support has focused on.

The project aims at building the capacity of woreda health offices, health centers, and health extension workers (HEWs) to deliver quality health and nutrition services, ensuring availability of nutrition supplies and equipment's, eventually leading to improvement in quality of health and nutrition services and adoption of recommended nutrition practices at household and community levels. Program support at the federal and regional level includes support to QI activities through providing technical support to FMoH in the development of Quality Improvement training manuals working jointly with other QI implementing partners. Anecdotal evidences on the status of implementation of quality improvement activities in project supported facilities showed that there has been improving institutionalization of quality improvement processes but with variable speed and intensity.

Objectives of the study

General Objective

The general objective of this study was to assess the implementation of quality improvement initiatives supported by the project, their effectiveness in improving quality of health and nutrition services provided in targeted PHCUs, and factors influencing QI initiatives.

Specific Objectives

Specific objectives of the study are to assess:

the level of implementation of QI initiative (Kaizen and MFI) among PHCUs supported by Growth through Nutrition Activity

improvements in the quality of targeted health and nutrition services at PHCUs implementing Kaizen and MFI in PHCUs supported by the project

barriers and facilitators in the implementation of QI initiatives (Kaizen and MFI) at PHCUs

Methods

Study Area and Period

This study was conducted at PHCUs in the four regions targeted by Growth through Nutrition project in Ethiopia, namely Amhara, Tigray, Oromia and SNNP regions. Data for the study was collected in August 2019.

Study design

A cross-sectional study supplemented by secondary analyses of QI project data was used. The quantitative aspect of the study focused on assessing the level of implementation and effectiveness of QI initiatives; the qualitative aspect of the study focused on identifying facilitators and barriers to QI implementation in targeted PHCUs.

Study population

The study population included a random sample of PHCUs. Quality Improvement team members from sampled HCs and HEWs from HPs, QI focal persons at HC and WoHO, and Growth through Nutrition zonal coordinators were included in the study. PHCUs that have been supported by the project for at least one year were eligible for the study.

Sample size and sampling strategy

A web-based LQAS sample size calculator, developed by FHI 360 through the Food and Nutrition Technical Assistance II Project (FANTA-2) Bridge, was used for the calculation (15). Assumptions for calculation of number of Health Centers were: Total number of PHCUs targeted by the project: 95 PHCUs, Outcome of interest: proportion of PHCUs that improved quality of health and nutrition related services, Upper threshold: 80%, Lower threshold: 50% and Margin of errors: $\alpha = 5\%$ and $\beta = 5\%$. This results in a sample size of 22 with a decision rule of 14. All quality improvement projects designed and implemented by the 22 sample PHCUs were to determine whether a health facility has brought improvement in quality of care or not. The 22 PHCUs were selected from a database of 95 project supported PHCUs that were reported to be implementing QI mechanisms in 2019. Eight PHCUs from those enrolled since 2017 and fourteen PHCUs from those enrolled since 2018 were selected. One health post receiving support for quality improvement was then included from each sample PHCU.

Data collection tools

Quantitative data collection tool with three separate modules were used to collect data from each study health center and health post. The modules include 1) QI functionality assessment module, 2) Quality improvement project assessment module, and 3) Kaizen implementation assessment tool. Two version of the tool were used for data collection, one for HC and the other for HP level data collection. Qualitative data were collected through key informant interviews and focus group discussions. KII and FGD guides were used to guide interviews and discussions.

Quantitative data management and analyses

Quantitative data was collected using ODK data collection templates. Data was uploaded to a central server immediately after completion of data collection in every facility. Upon completion of data collection, data from the central server was exported in CSV format from which it was imported to STATA version 16 for Windows for analyses. Descriptive statistics were run to describe study PHCUs in terms of their QI infrastructure, implementation of QI processes, and effectiveness of their QI projects. Audio recordings from FGDs and KIIs were transcribed and translated into the English language. Transcripts were then coded by thematic area to categorize specific pieces of data into their respective themes. Transcribed data were coded using OpenCode qualitative data management software based on a pre-defined qualitative coding framework. Results of the qualitative data were analyzed and presented in a way that helps identify key barriers and facilitators in the implementation of QI models.

Ethical Considerations

This study belongs to the category of "Exempt human subjects research". Written permission was obtained from respective regions/District health offices. All study participants were informed about the purpose of the study and informed consent was obtained from all study participants before data collection. Confidentiality of issues raised during discussions in a group was strictly maintained by the research team. Any communication of findings will be made in a way that does not identify specific respondents.

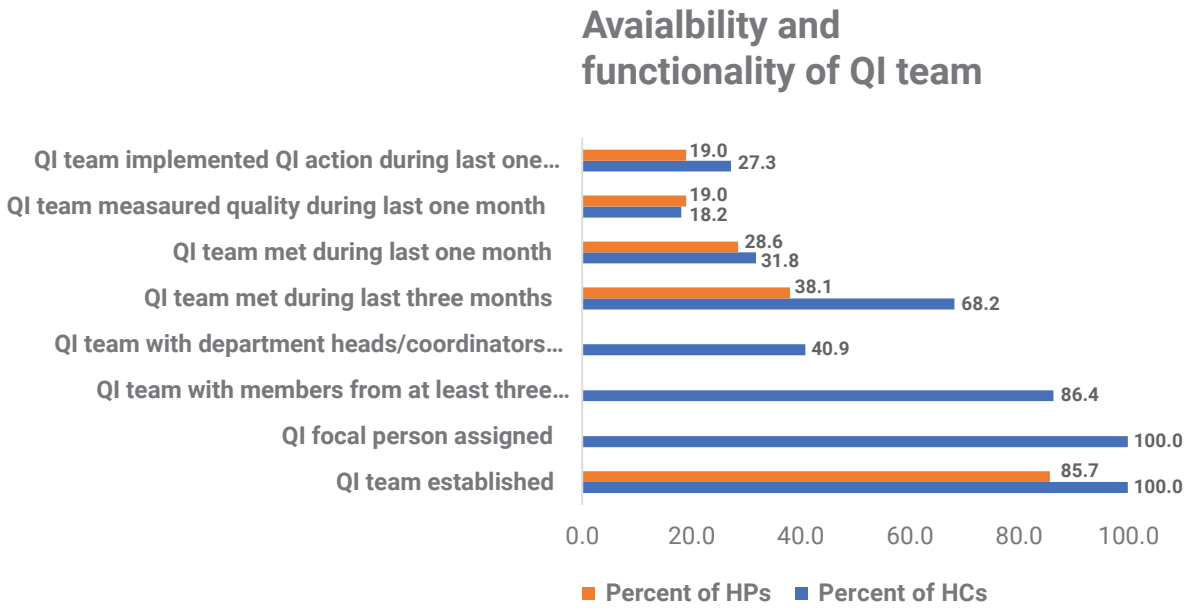
Results

Level of Implementation of QI Processes

Availability and functionality of QI teams

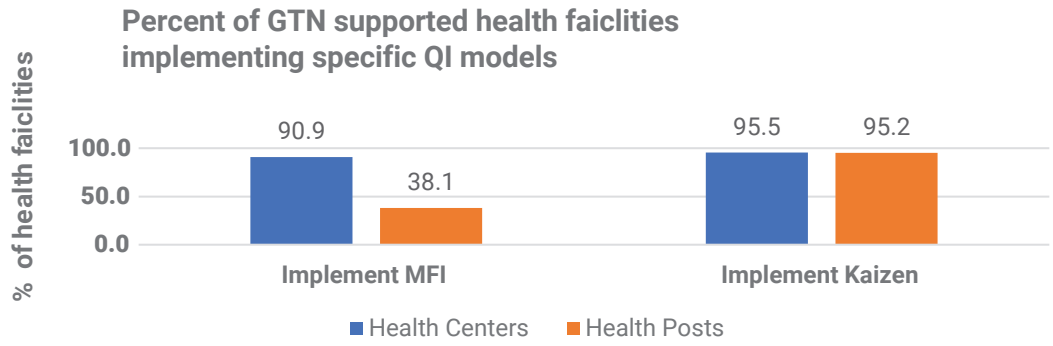
All study health centers have established quality improvement teams and assigned quality improvement focal persons. Eighteen (85.7%) of health posts have also reported that they have established a quality improvement team. Despite the availability of quality improvement teams at health centers even before receiving support from the project, they have become active or been revitalized after getting training of staff through the project. The median number of quality improvement team members among health centers was seven, ranging from a low of four to a high of ten.

Figure 1: Availability and functionality of QI teams



At the time of this assessment 20 of the 22 health centers and 8 of the 21 health posts have been implementing Model for Improvement. Kaizen was also implemented in 21 of the 22 health centers and 20 of the 21 health posts (Figure 2).

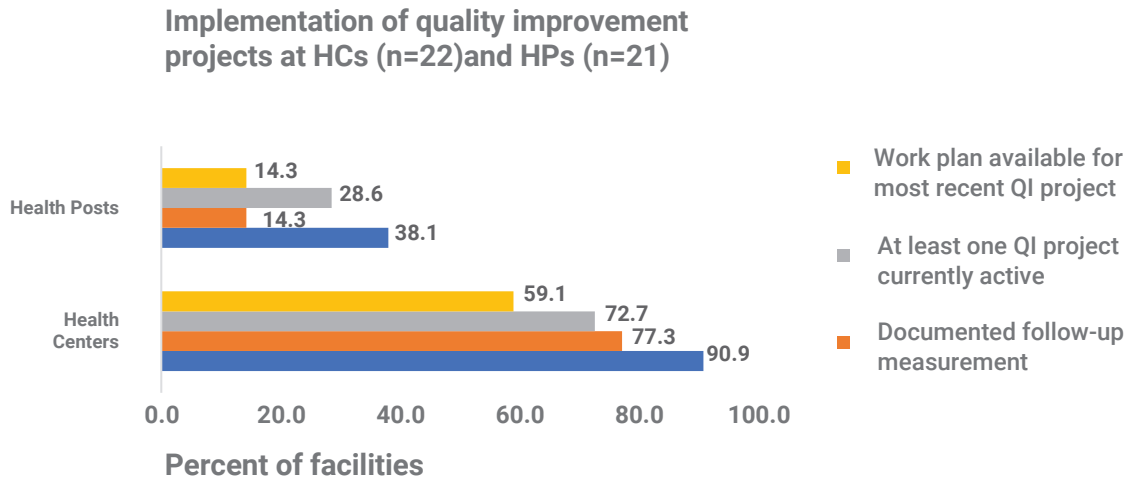
Figure 2: Implementation of MFI and Kaizen among GTN supported HCs and HPs



Implementation of MFI

As shown in Figure 2, Model for Improvement was implemented in 90.9% of health centers and 38.1% of health posts among project supported PHCUs. The level of implementation of Model for Improvement was assessed by examining evidences for the conduct of specific steps in implementing Model for Improvement since enrollment in project support and during the three months period preceding data collection. Findings showed that 20 (90.9%) health centers and 8 (38.1%) of the health posts implemented at least one quality improvement project since their enrollment in the project; however, there are gaps in doing MFI regularly and up to the standard. Documented follow-up measurement for targeted interventions was obtained only for 77.3% of the health centers and 14.3% of the health posts. Only 59.1% of the health centers had a workplan available for their most recent quality improvement project (Figure 3).

Figure 3: Implementation of quality improvement projects among GTN supported PHCUs

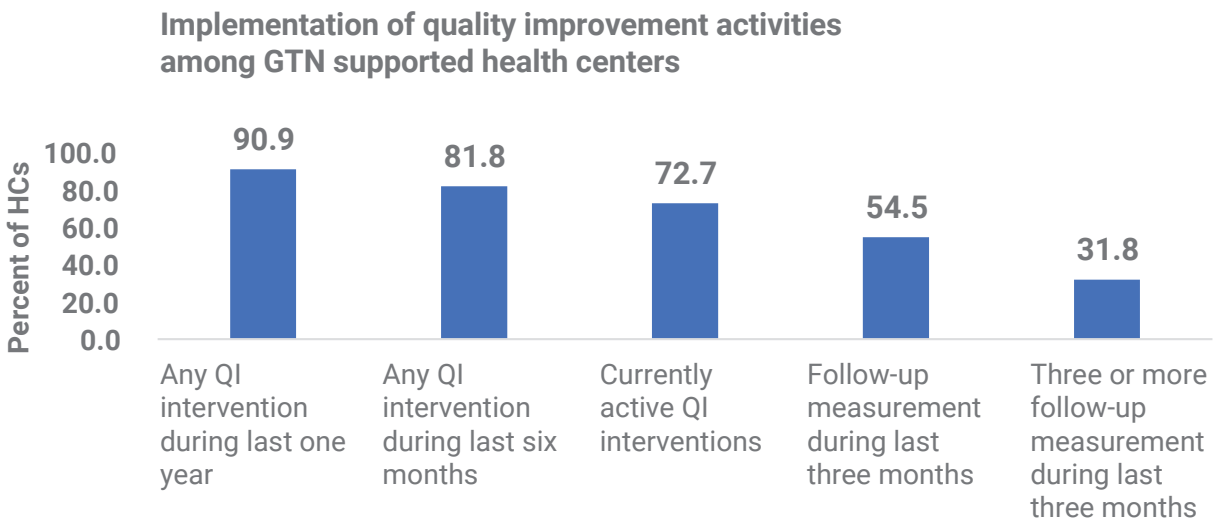


Quality improvement interventions and follow-up at HCs

Since the beginning of Growth through Nutrition's support, a total of 61 QI projects were implemented in the study health centers, averaging two QI projects per health center per year. In the majority, 20 (90.9%) of the 22 study health centers implemented at least one quality improvement intervention during the one-year period preceding data collection. The median number of QI projects was 2.5 per health center (IQR: 2, 4; Range: 0, 5).

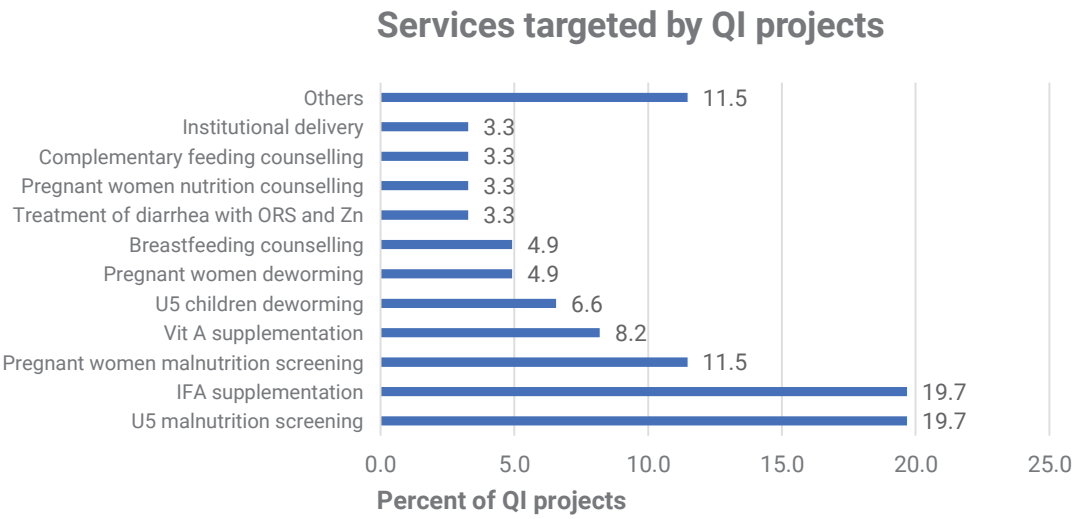
The proportion of health centers with at least one QI intervention during the last six months and those with currently active QI interventions was 81.8% and 72.7%, respectively. However, follow-up measurement was a relatively weaker link in the quality improvement cycle. Given the nature of indicators targeted for improvement, it is expected that data would be available at least monthly because of the link between indicators used for quality improvement and the monthly reportable set of indicators of the health system. However, only 54.5% of health centers had at least one follow-up measurement and only 31.8% of them had three or more follow-up measurement of any indicator during the three months period preceding data collection (Figure 4).

Figure 4: QI interventions and follow-up measurement practice of health centers



Interventions targeted by quality improvement projects were well aligned with indicators used to assess gaps in quality of care. The most common QI interventions were nutritional screening and supplementation targeting pregnant women and under-five children (Figure 5).

Figure 5: Interventions targeted by QI projects at HCs



Change ideas implemented to address gaps in quality of care targeted by quality improvement projects were mostly related to availing equipment and supplies and provision of trainings. Details of specific quality improvement actions was obtained for 37 quality improvement projects. Findings showed that 15 (40.5%) of these actions were related to making necessary equipment and supplies available (Table 1).

Table 1: Quality improvement actions at health centers (n=37)

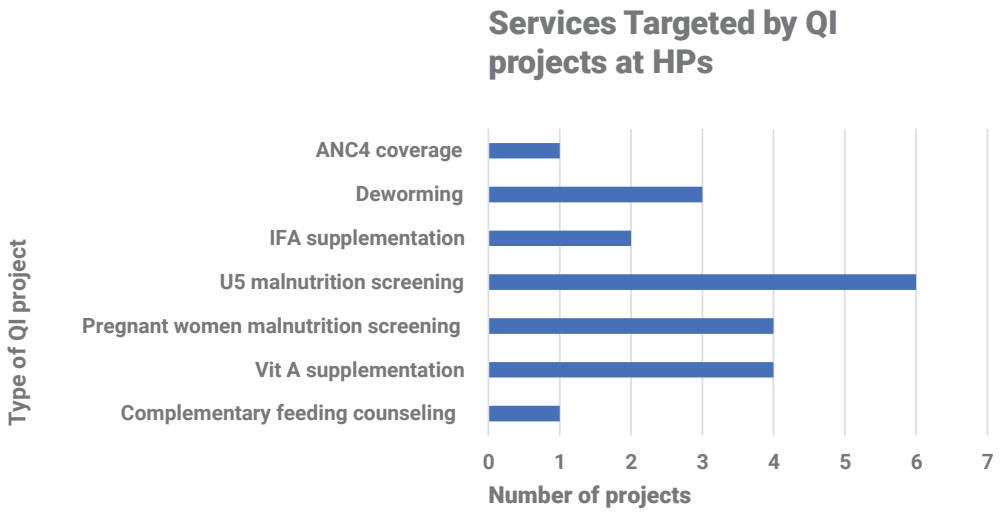
Action point	Percentage
Availing equipment and supplies	40.5
Training for health workers	18.9
Awareness creation for the community	13.5
House to house U5 screening for malnutrition	5.4
Cooking demonstration	5.4
Meeting with religious leaders	5.4
women dev army meeting	2.7
integrated malnutrition screening with GMP	2.7
rewards/incentives	2.7
strengthen referral between HP & HC	2.7

Quality improvement interventions and follow-up at health posts

As described earlier, eight (38.1%) health posts implemented MFI following support from the project. Six of the eight health posts also reported having an active QI project at the time of data collection. Quality improvement action points/change ideas at health posts were mostly related to availing equipment and supplies and creating awareness among pregnant women. Other actions included community mobilization and discussions with kebele administrators.

Interventions targeted by quality improvement projects at the HPs were well aligned with indicators used to assess gaps in quality of care. The most common QI interventions were nutritional screening of under five children and pregnant women, deworming of U5 children along with vitamin A supplementation (Figure 6).

Figure 6: Interventions targeted by QI projects at HPs



Implementation of Kaizen

Kaizen has been implemented in 21 (95.5%) of the 22 study health centers and 20 (95.2%) of the 21 study health posts. Quality improvement focal persons, QI team members, and Health Extension Workers were familiar with the concept of Kaizen.

Kaizen was implemented throughout all departments in 15 health centers while its implementation was limited to maternal and child health units in five of them. There were clear signs of efforts to implement Kaizen in most of the health facilities included in this study. Progress towards implementing Kaizen as a daily routine was in general higher for initial steps including sorting, straightening, and shining. However, there was relatively lower achievement in the areas of standardizing and sustaining. Kaizen was to some extent better implemented in health posts than in health centers.

Effectiveness of QI activities in improving nutrition interventions at HCs

A total of 61 quality improvement projects were reported by 20 of the 22 study health centers. Two health centers didn't implement any quality improvement project even though they received training and other support from the project and established QI teams. Follow up measurements were available for 54 quality improvement projects from 18 health centers. Evidences of improvement was found for 35 (64.8%) of the quality improvement projects. Evidence of improvement was too few runs for 26 (48.1%) of the projects and consistently increasing trend for 9 (16.7%) of the projects. There was no evidence of quality improvement for 19 (35.2%) of the quality improvement projects. Aggregate data showed that 14 of the health centers have improved quality of care through MFI. This result is marginally significant compared to the LQAS decision rule of 14 out of 22.

Facilitators and barriers of implementation of QI initiatives

Qualitative data collected through key informant interviews and focus group discussions identified several facilitators and barriers to implementation of quality improvement models. Four major categories of facilitators were identified: 1) structure, 2) support, 3) capacity for service delivery, and 4) simplicity of QI models.

"The first thing that facilitated implementation of QI in our health center is the provision of trainings by the project even though it was not adequate. Training was provided on both Kaizen and MFI. The other thing was supervision and monitoring of our activities … During supervision time they give us feedback and take corrective measures for those gaps."

Several barriers to implementation of quality improvement processes were identified. The major barriers were related to 1) Limited ownership and focus on reportable output indicators, 2) Limited technical capacity on QI processes, 3) Interventions beyond HC control, 4) inadequate support, 5) Capacity at the HP level and 6) contextual factors.

"One of the barriers to implementation of QI is shortage or absence of drug supply in required amount and time. For instance, absence of iron folate supply when needed interrupted consistency of quality services affecting implementation of MFI in the health center"

In conclusion,

Quality improvement models have been effectively introduced in project supported PHCUs. Institutionalization is however in its early stage. Quality improvement teams are universally available, but their functionality is sub-optimal.

Implementation of Kaizen has been universal in both health centers and health posts. All facilities implementing Kaizen have shown evidences of good progress in implementing Kaizen except in the areas of standardization and sustaining.

Implementation of MFI was universal in health centers, but it was tried only by a very small number of health posts.

Health centers supported by the project were in general effective in improving quality of health facility-based nutrition interventions; however, evidence of effectiveness was not demonstrated in several quality improvement projects suggesting sub-optimal capacity in identifying root causes, designing effective change ideas, and monitoring progress. Dwelling on first QI projects, limited follow-up measurements, and focusing on gaps that could have been addressed with one-time action were among the major limitations of health centers in designing and implementing QI projects.

Establishment of QI structure involving QI team, focal person, and QI sub-teams, support from the project in the form of training and coaching, strong service delivery capacity, and simplicity of selected models for quality improvement were facilitators of effective implementation.

Barriers to implement the QI models included unbalanced focus on reportable output indicators, limited technical capacity ownership of QI processes, inadequate support from WoHOs, and contextual factors affecting service delivery processes.

Limitations of the study

The main limitations of this study arise from dependence on secondary data sources for assessing the effectiveness of QI projects. The use of secondary data sources to measure effectiveness of QI projects denied the possibility to control the quality of indicators used to measure performance as well as their measurement processes. Findings of this study are therefore as accurate as measurements made by quality improvement teams. The fact that members of quality improvement teams have received intensive trainings and provision of standard indicators with clear guidelines on their measurement as part of the project's support allows us to be confident enough to base our conclusion on available data.

Recommendation

Based on the findings, the QI activities at the PHCUs will benefit from introducing a strong monitoring system to allow timely measurement of the progress, improving documentation, engaging of management/supervisors from the Woreda health office, strong support from projects like growth through nutrition and others. Lack of basic equipment and supplies is an important determinant of quality of nutritional interventions. It is important that these factors are addressed before considering MFI as solution. Therefore, Kaizen in preparation for MFI can be considered as a strategy to ensure that MFI focuses on issues that need more stringent measurement and improvement processes. Strengthen involvement of community members in the process of identifying gaps and designing solutions as part of QI processes at HC level.

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Reducing Neonatal Death at Neonatal Intensive Care Unit (NICU), Zewditu Memorial Hospital

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Abstract

Introduction: Neonatal mortality is a significant contributor to infant mortality. Globally, in 2016, about 3% of all neonatal death was recorded in Ethiopia, respectively. According to EDHS 2016 report, neonatal mortality in Ethiopia had been reduced by 41%. Baseline data from Zewditu Memorial Hospital revealed high neonatal mortality (38 deaths per 1000 live births) in 2018/2019 G.C.; nearly 37% of the cause was neonatal infection, and 8% of neonatal deaths due to infection were occurred among neonatal intensive care unit (NICU) admission. The quality improvement (QI) team of the hospital initiated improvements intervention aimed to decrease neonatal death due to neonatal infection from 8% to 4% at NICU in Zewditu memorial hospital by January 3, 2020.

Methods: The Model for Improvement was utilized. Audit and a variety of qualitative methods used to understand magnitude and identify the root cause problems and proposed change ideas. Interventions include assign a full time guards at the NICU entrance and train on the importance of restricting entrance, prepare infection prevention materials and utilize it in NICU, decentralizing neonatal neuro surgery cases to other hospitals, segregate NICU those septic's from non-septic's and discard all nonfunctional materials and maintain those which can be maintained and rearrange the rooms. One day orientation was prepared and provided by Neonatologist to all staff. Changes were tested using the Plan-Do- Study-Act methodology & gathered data on process and outcomes. *A run chart* was applied to detect and evaluate changes before and after implementation of the changes.

Results: The proportion neonatal death due to sepsis reduced from 8% to 2%. This can be explained as the proportion neonatal death due to sepsis was dropped from two weekly death to death free weeks. The number of bed occupied by neuro surgery cases were decreased from 70% of beds to 40%.

Lesson Learnt & Conclusions: This project showed that implementation of changes particularly keeping basic infection prevention procedure in the NICU ward had significantly reduced morbidity and mortality of neonate due to infection. Decentralization of paediatric neurosurgery case management to other hospitals also significantly improved the service quality of care at NICU in Zewditu Hospital

KEYWORDS: Neonatal, Deaths, Quality Improvement (QI), Hospital, NICU, Zewditu Memorial

Introduction:

Neonatal mortality is a significant contributor to infant mortality. Globally, in 2016, about 3% of all neonatal death was recorded in Ethiopia, respectively.[1] According to the Ethiopian Demographic and Health Survey (EDHS, 2016) report, neonatal mortality in Ethiopia had been reduced by 41%.[2] The causes of deaths, however, are multiple and may reflect variation in quality of care and mortality reduction can be best achieved by identifying problems and targeting a number of quality improvement interventions.[3]

Problems:

Baseline data from Zewditu Memorial Hospital revealed high neonatal mortality (38 deaths per 1000 live births) in 2018/2019 G.C. From all the deaths nearly 37% of the cause was neonatal infection. And nearly 8% of neonatal deaths due to neonatal infection were occurred among neonatal intensive care unit (NICU) admission. The admitted case mix in NICU was very broad and a large proportion of neuro surgery patients occupied the 70% of NICU beds. High overcrowding and bed occupancy resulted from the pediatrics neurosurgery patients have been a consistent finding as Zewditu hospital is the only hospital which provides pediatrics neurosurgery service.

A decision was therefore taken by the quality improvement (QI) team of the hospital and initiated improvements intervention intended to address known systems gaps and problems, which we hypothesized would improve the quality of care, patient outcome. The team aimed to decrease neonatal death due to neonatal infection from baseline 8% to 4% at NICU in Zewditu memorial hospital by January 3, 2020.

The quality improvement [QI] project described in this article was conducted at Zewditu Memorial Hospital, which is a teaching and general referral hospital and it is among the largest hospital in Addis Ababa affiliated to College of Health Sciences, Addis Ababa University.

The project started with a review of hospital deaths data with audit and a variety of qualitative methods to understand magnitude and identify the root cause problems or gaps in current quality of care. The QI team communicated with a team consisting of NICU head nurse and the hospital neonatologist and hospital leadership to discuss on the gaps and develop the interventions, and reasons why the intervention(s) was expected to work. The team revealed several root cause problems and proposed change ideas.

Methods

The Model for Improvement and sequential Plan-Do-Study-Act (PDSA) cycles were utilized to test change ideas.

Based on the root causes and quality gap identified, change ideas for interventions included the following five elements: assign a full time guards at the NICU entrance and train the guards on the importance of restricting entrance, prepare infection prevention materials like Apron, shoes and utilize it whenever enter into the NICU, decentralizing neonatal neuro surgery cases to other hospitals rather than burden to this hospital (decrease admission to enhance bed occupancy rate), segregate NICU those septic's from non-septic's and discard all nonfunctional materials and maintain those which can be maintained and rearrange the

rooms. One day orientation was prepared and provided by Neonatologist to all staffs in the ward on standard Infection prevention procedures to facilitate the initiative. All five components of the programme were developed and implemented & gathered data outcomes for 5-months.

Data collection and measurement was performed using prepared forms and tools and performed by a assigned and each of the changes tested were assessed by qualitative as well as quantitative measures. The outcomes of the project were analyzed using Run chart. The management and the established team met regularly to review and encourage progress.

Measures:

Outcome measure

- The proportion of death among the total admission
- The proportion of the death due to sepsis

Figure 1. Run chart show the trend of neonatal admission and death in Zewditu memorial hospital

Process measures

- Proportion of bed occupied by neuro-surgery cases
- % of staff oriented

Balancing:

- Percentage of neonatal deaths that from the admitted cases for neonatal neurosurgery case

Results:

The proportion neonatal death among NICU admitted neonates decreased from median of 18.2% to 9% while neonatal death due to sepsis reduced from 8% to 2%. This can be explained as the proportion neonatal death due to sepsis was dropped from two weekly death to death free weeks. The number of bed occupied by neuro surgery cases were decreased from 70% of beds to 40%.

Since the Nero surgery cases bed occupancy rate was decreased, admission of NICU also increased (from weekly average of 19 to weekly average of 35). The proportion of death among the total admission also decreased.

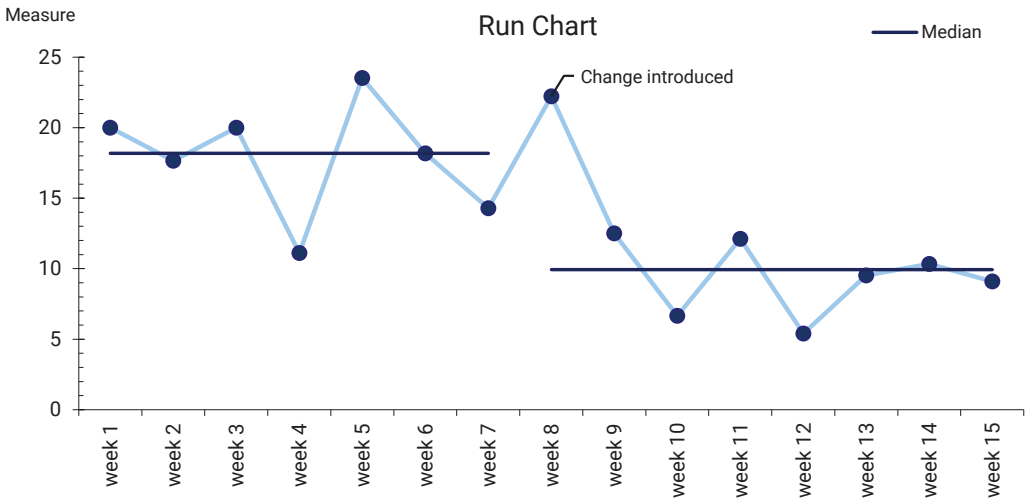
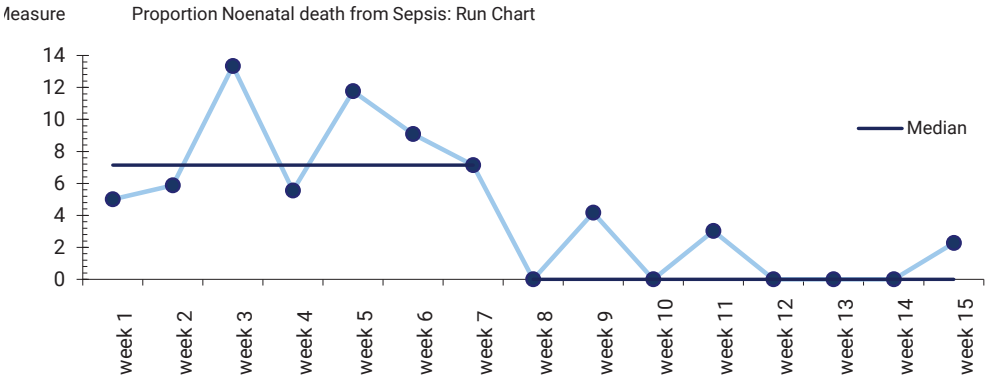


Figure 2. Run chart proportion of neonatal death secondary to sepsis in Zewditu Memorial Hospital



On the project period the number of bed occupied by neuro surgery cases were significantly decreasing (from 70% of beds to 40%).

Total deaths from the neuro surgery were 11, this number would not show the clear magnitude of the burden since most of the neonate death due to Nero surgery cases occurred after discharge and more ever a significant number of readmission were observed after the discharge.

The team observed that bed occupancy was high in neuro surgery cases. More ever a single Nero surgery case ,the bed would be occupied by more than three weeks which significantly affected the NICU service provision cases as well as the quality of the service that were provided.

Lessons learnt:

Decentralization of paediatric neurosurgery case management to other hospitals in the region and Addis has significantly improved the service quality of care at NICU in Zewditu Hospital. Since most neonatal deaths were occurred by preventable cause and simple measures did have much improvement in the neonatal death reduction.

Conclusion:

This project showed that implementation of changes particularly keeping basic infection prevention procedure in the NICU ward had significantly reduced morbidity and mortality of neonate due to infection. Actually neonatal neuro surgery care should be provided by the hospital, the hospital should not undermine rather prioritized for the basic lifesaving service in the NICU.

Limitation:

Availing Nero surgery materials created a big problem. Since this medical equipment's for neurosurgery was not available in the market, it made difficult to decentralize the service to other hospitals, permanently. So expanding the NICU ward should be the next priority area to be considered.

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Improving IPPFP Service Up-take in Three PHCUs and one PHL of Sululta ural district -F/S/Z, Oromia, Ethiopia

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Abstract

Background: A woman's ability to space and limit her pregnancies has a direct impact on her health and well-being as well as on the outcome of each pregnancy. Family planning has been an integral part of postpartum care, where postpartum family planning (PPFP) targets the prevention of unintended pregnancy and closely spaced pregnancies through the first 12 months following childbirth. Studies show that roughly 95% of women who are 0 to 12 months postpartum want to avoid pregnancy in the next 24 months, but 70% of them are not using contraception. Analysis of Ethiopia demographic and health survey showed a similar challenge with 23% PPFP rate and significant disparity between urban and rural residents. One of the Ethiopian National Health Care Quality Strategy approaches includes support to facility-based quality improvement teams (QIT) that ensure family planning and other essential services are streamlined and provided with the national standards. The Strategy emphasizes on the importance of internally motivative quality improvement effort. USAID funded program strengthening primary health care services in Ethiopia, strengthened facility-based QIT to apply quality improvement (QI) approaches that could improve PPFP service up-take. This paper presents lessons from the quality improvement implementation and its effect in improving the PPFP service uptake in four selected health facilities of Sululta rural district from Aug 2018 to 2019.

Methodology: Four health facilities were selected in consultation with Finfinne Special Zone-ZHO and Sululta rural district health office quality and equity unit leaders, to improve Immediate PPFP service uptake by applying QI approach. The selection was made based on facility readiness. Following this we supported those facilities on; establishing QIT, conducting baseline self-assessment/clinical service quality audit using national MNH quality of care assessment tool, and provided basic QI training for QIT members as per national QI training manual. During the training session each facility QIT identified problems through brainstorming and then prioritized using prioritization matrix. All were prioritized low up take of immediate PPFP, which was 0%. And developed stepwise QI project to improve IPPFP: constructed problem statement, set a goal/aim, analyzed root causes using fishbone and driver diagram, developed change ideas, set indicators for

measuring process and outcome including data collection plan. The QIT met biweekly for the first three months and then monthly to review progress of change idea under testing whether it is contributing for the desired outcome or not.

Results: The major gap identified during the baseline assessment was IPPFP service utilization was 0% in all selected health centers as per the clinical service quality audit result. After testing the change ideas prioritized by QI project (peer to peer skill transfer, timely request & refilling of contraceptive commodities and providing proper counseling as per standard) IPPFP service uptake was increased from 0% to 25% in Derba, 0% to 35% in Chancho, 0% to 57% in Gorfo and 0% to 69% in Duber.

Conclusion: Immediate PPFP service uptake has increased significantly by applying model for improvement (MFI) which could result in reducing unwanted pregnancy and related complications. This depicted that there is a need to continually use peer to peer skill transfer, timely requesting and availing contraceptive commodities and supplies, and providing appropriate counseling for couples, this means continuous quality improvement process helped the team to improve the service uptake in the health facilities.

Background

Postpartum family planning (PPFP), is the initiation and use of contraceptives during the first year after delivery with the intention to prevent unintended pregnancy and closely spaced pregnancies through the first 12 months following childbirth [1]. Family planning service has been an integral part of postpartum care .The ultimate purpose of PPFP is to prevent unintended pregnancy, too soon after childbirth, when another pregnancy could be harmful to the health of the mother or breastfeeding baby [1]. Studies show that roughly 95% of women who are 0 to 12 months postpartum want to avoid pregnancy in the next 24 months, but 70% of them are not using contraception. Pregnancies in the postpartum period pose the greatest risk for women and their infants and have increased risks of adverse health outcomes [8]. During postpartum period, family planning (FP) can prevent about 30% of maternal mortality and 10% of child mortality if couples space their pregnancies more than 2 years apart. In contrary, closely spaced pregnancies within the first-year postpartum increase the risks of preterm birth, low birth weight and small-for-gestational-age babies [9]. Providing postpartum family planning is therefore crucial for ensuring the health, human rights and well-being of women and their babies [1].

According to analysis of the 2016 Ethiopia demographic and health survey data by Degnew et al, PPFP rate is 23% nationally and 15.5% in Oromia regional state [4]. Coordinated effort at all levels of the health system, use of multiple entry points to integrate FP with other service, involvement of government health officials, improving provider capacity and strengthening availability of commodity with expanded contraceptive method choices were the interventions contributed for the successfully improving of the quality FP service [3; 7a performance assessment is required to determine countries' progress.\ nMETHODS: An updated version of the Family Planning Estimation Tool (FPET].

The Ethiopian National Health Care Quality Strategy emphasizes the importance of internally motivated quality improvement effort lead by facility-based quality improvement team at a health facility level [2]. Quality Improvement team in health facilities are established with a purpose of applying continuous quality improvement in the health facility to improve the quality of care provided to the community they serve. The members of the QI team are facility leaders (system leader), unit heads (MNCH, FP, OPD, Pharmacy, laboratory, Finance unit head and HMIS focal person), representative from each unit with specific expertise [2].

USAID: Transform: Primary Health Care project is a five-year project funded by USAID and implemented by a consortium of partners including Pathfinder International, John Snow incorporate (JSI), Ethiopian midwife association (EMwA), Malaria Consortium, EnCompass and Abt. Associates. It intervenes in four big regions (Oromia, Amhara, SNNP and Tigray) to support health sector transformation agendas to end preventable child and maternal death. The project is supporting primary health care facilities nationally in 360 districts since 2017, with thirteen focus area (HSS, HCF/CBHI, FP/RH, MNH, CHEPI, AYHD, Nutrition, Malaria, quality improvement & quality assurance, Obstatric Fistula, Gender, SBCC and Program Learning). USAID Transform: Primary Health Care Project, Oromia region has interventions in all 20 zones and 162 districts and currently supporting facility based QIT in fifty-three districts and in 191 (3GHLs, 8PHLs and 180 HCs) health facilities.

Four selected health centers in Oromia region improved immediate PPFP service up take by applying nationally adopted models - Kaizen & Model for improvement (MFI)[5]. This paper presents lessons from the quality improvement implementation and its effects to improve IPPFP service from Aug 2018 to Dec 2019 in health facilities selected from Sululta district, a rural district of Oromia regional state in Ethiopia. The facilities being supported to learn from their performance, work on quality improvement projects and share to others the results they have got from their efforts. The aim of this paper is to draw lesson and share to other working in similar setting.

Methods

Problem Identification and Prioritization:

The QIT in all four health centers conducted self-assessment, that is a clinical service quality audit using national MNH quality audit tool for health centers. The self-assessment revealed several problems including low immediate postpartum family planning service uptake. As part of the self-assessment, baseline data was collected from all four health centers' health management information system data and facility registers (such as labor and delivery and family planning registers) were reviewed. This provided a baseline data as of Aug 2018 which showed contraceptive uptake (facility Contraceptive Prevalence Rate), PPFP and Immediate PPFP (within 48hours of child birth) service utilization of (sululta rural district,84%, 23.7% and 0%; Chancho HC, 57%, 7%, & 0%; Derba HC: 79%, 4%, & 0%; Durber HC: 75%, 5% & 0% and Gorfo HC: 61%, 5%, & 0%) respectively.

The QITs identified their respective facility problems through brainstorming based on baseline clinical audit result captured by chart review. They identified and listed the problems, then prioritized using prioritization matrix with the criteria; magnitude of the problem, feasibility, and importance to solve. They used rating scale 0 to 5. All health centers were prioritized low up

take of immediate PPFP, which was 0% during baseline assessment. Following this they developed a clear and concise statement that describes the symptoms of a problem and aim statement to improve the existing performance to the desired performance level.

Table 1. Problem identification and prioritization Matrix (scale range 0-5)

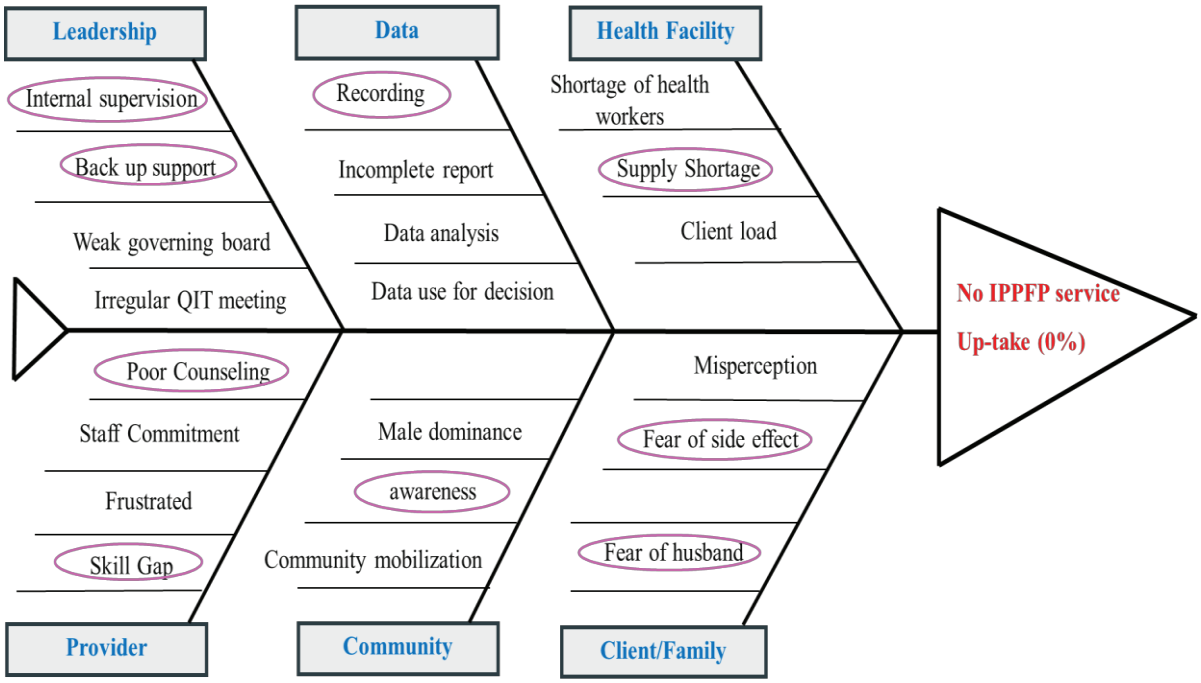
S. N	Lists of problems identified	Prioritization criteria				
		Magnitude	Feasibility	Importance	Total	Rank
1	Low long act reversible contraceptive (LARC) service utilization	2	3	3	8	7th
2	Low ANC4 service utilization	4	4	5	13	2nd
3	Low Petrography utilization for laboring month	4	3	5	12	3rd
4	Low PNC service performance	4	4	2	10	5th
5	Low Skilled delivery	4	3	4	11	4th
6	Low Immediate PPFP service up takes	5	4	5	14	1st
7	Low Maternal nutrition screening and counseling	3	3	3	9	6th

Identifying root causes (root cause analysis):

Each health facility QIT identified root causes of low IPPFP service up take using fishbone diagram to clearly map the causes of the problem.

The root cause analysis with fishbone diagram was critical to facilitate the QIT brainstorming sessions and kept the team to be focused on the core causes of low immediate PPFP service, the team has identified the causes for no IPPFP service as clients were not counseled on PPFP properly during antenatal care follow up, there was low competency and commitment on PPFP on the providers side, there was poor data recording and documentation, poor back up service (senior experts mentor the junior health service providers with in the facility and to health extension workers on family planning service) support higher-level leaders, shortage of family planning commodities and supplies, etc. The root cause analysis identified six major categories affecting IPPFP service quality and its uptake: leadership, data management, health facility service delivery, provider related, and community, family or individual client related barriers (see Figure 1). As a result, the QIT set an aim to address the problems and improve immediate PPFP service uptake.

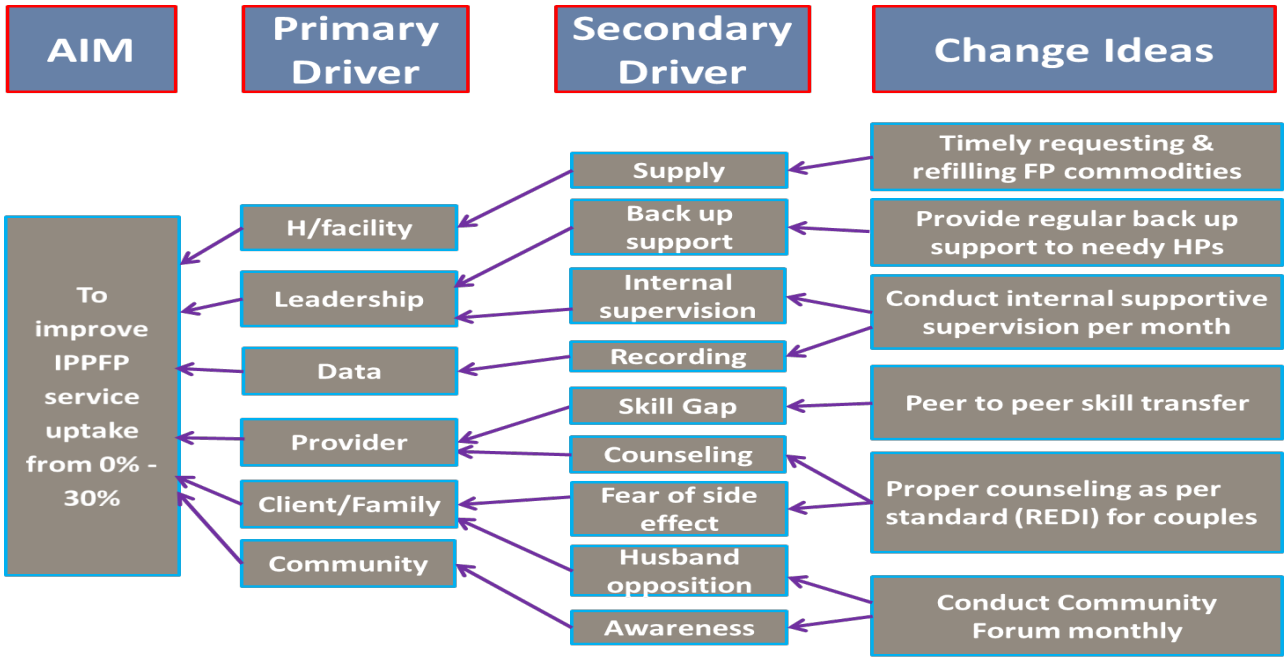
Figure1. Root cause analysis (Fishbone diagram) for low IPPFP service up-take at Derba, Chancho, Gorfo & Duber HCs.



Developing Change Ideas:

The QIT with maternal and child health sub-QIT of the respective health centers used driver diagram to develop and display solutions for causes identified for low IPPFP service utilization during the root causes analysis. The team focused on the six main root cause as indicated on the above fishbone diagram. Multiple steps were followed to develop these solutions. First, the team set aims to improve immediate PPFP uptake by 30% through improving service delivery process in the identified facilities. Second, the team listed primary and secondary drivers that can lead towards achievement of the aim. Change ideas (interventions) that can lead to quality improvement and increased service uptake were linked with each driver (see Figure 2). Third, a set of indicators were developed to measure and monitor the progress of changes. Fourth, change ideas were tested repeatedly following a Plan, Do, Study and Act (PDSA) cycle to ascertain fidelity of implementation of the QI approach. The PDSA cycle included monthly data collection and monitoring performance overtime using run charts.

Figure 2. Driver Diagram



Interventions/Change ideas:

Change ideas were developed in line with the six categories of problems identified. To improve immediate PPFP service uptake at the facility, interventions that can improve counselling services, service providers performance, contraceptive supplies, back up support to satellite health posts and internal supportive supervision to address the gaps in leadership were changes identified by each QIT team. Of these, they were prioritized; intervention that can improve counseling service, service Provider's performance, contraceptive supply and community awareness about immediate PPFP, spousal opposition and fear of PPFP side effects.

Clinical service providers / Midwives providing ANC services continuously counsel pregnant women visiting ANC clinic for IPPFP use after giving birth using REDI- family planning counseling steps.

Service providers put a sign on follow up card of pregnant women who agreed to receive PPFP services immediately after giving birth as a reminder or reference that the client was agreed to receive the service. A midwife who assisted the delivery then refer to the card and reinforce the counseling and provide the IPPFP choice of the client after completing the delivery services based on the eligibility criteria and condition of the mother. This process was monitored by observation of some clients during service delivery and sample card review.

On the job training through peer-to-peer skill transfer

Senior Midwifes and/or health care providers who get trained on PPFP service provision will train other midwives on the job and transfer skill.

Timely request and refill Family planning commodities and consumables.

To reinforce timely request and refill of family planning commodities and consumables, the service providers were oriented on how to request and refill commodities when 25% of stock remains on hand by regional QI officer and FP/RH officer. The orientation was later strengthened through FP planning exercise / package woreda establishment, provided TOT and RO training on FP services. Of the initiative/ package activities, resource allocation, logistics forecasting and quantification were activities contribute to improve contraceptive supplies.

Community mobilization through community forum on monthly basis.

Provide health education on family planning methods and benefit for community key informants (religious leaders, community leaders, and others). The forum was organized and conducted in collaboration with Kebele structures (e.g. WDA-Women development army, Kebele managers, etc.) by integrating with kebele level meetings/conferences on monthly base.

Measures/Progress monitoring and adaptations/:

To measure whether the quality improvement approach brought about improvement or not, outcome and process indicators were set and tracked continuously.

Outcome measure:

- Percentage (%) of women who received IPPFP service within 48 hours postnatal period.

Process measures:

- number of staffs who received on job training through peer to peer skill transfer.
- number of days IPPFP commodities available per month.
- % of women received counseling as per standard with sample card review and observation
- number of community forum conducted per quarter.

Data Collection Procedure:

The facility HMIS focal person (HIT) who is a member of the QIT abstracted the data from ideal sources every month and aggregate as per the indicator stated above. The source of data for outcome measure/indicator was labor and delivery registration and client card. The data source for Process measure/indicator were client card, on job training registration, stock monitoring chart (e.g. BIN card) and completed community forum registration sheet. Data collection method was counting and tally.

Data Analysis:

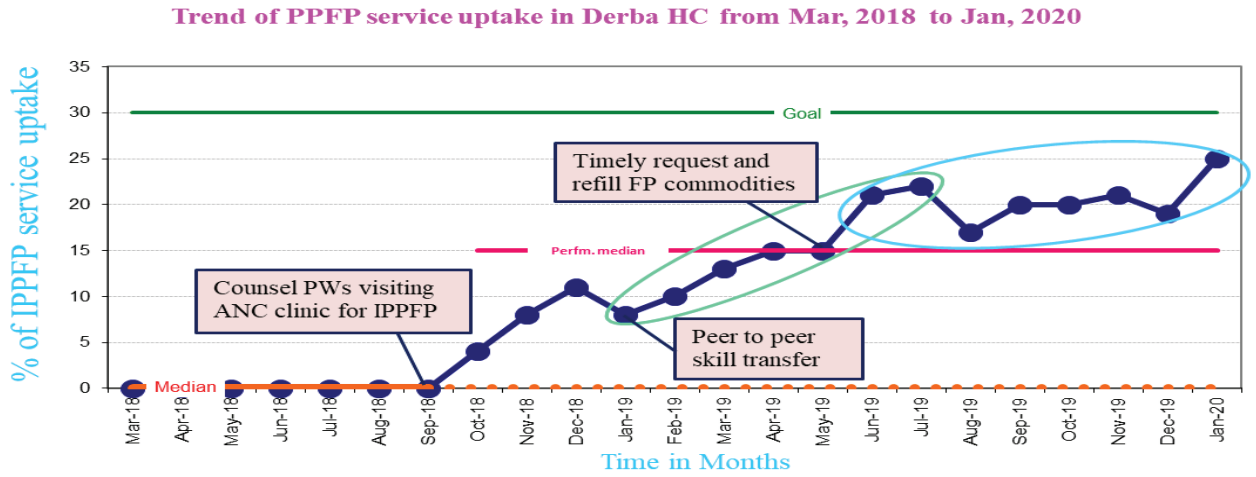
The progress was monitored through regular data collection, analysis and plotting it against over time manually at facility level and finally the project supported the team to construct run chart using MS-Excel. Data was collected on monthly basis, then analyzed and plot on run chart by HMIS focal person & MCH head and share the result with QIT during QI team meeting to review the PDSA cycle to make decision on the next step. Repeated PDSA cycles were used

for testing the change ideas since the team test one change idea at a time. Each process (e.g. strength, weakness of the change ideas under testing towards the desired outcome and even challenges encountered during testing period if any) was documented on data collection tool for routine QI team meeting and the corrective actions taken accordingly. Means action plan was developed to sustain the strength part and to solve weakness/challenges to enhance the achievement of desired goal. The QI teams were supported with regular coaching(quarterly) and conducting learning sessions (biannual) to foster peer to peer learning.

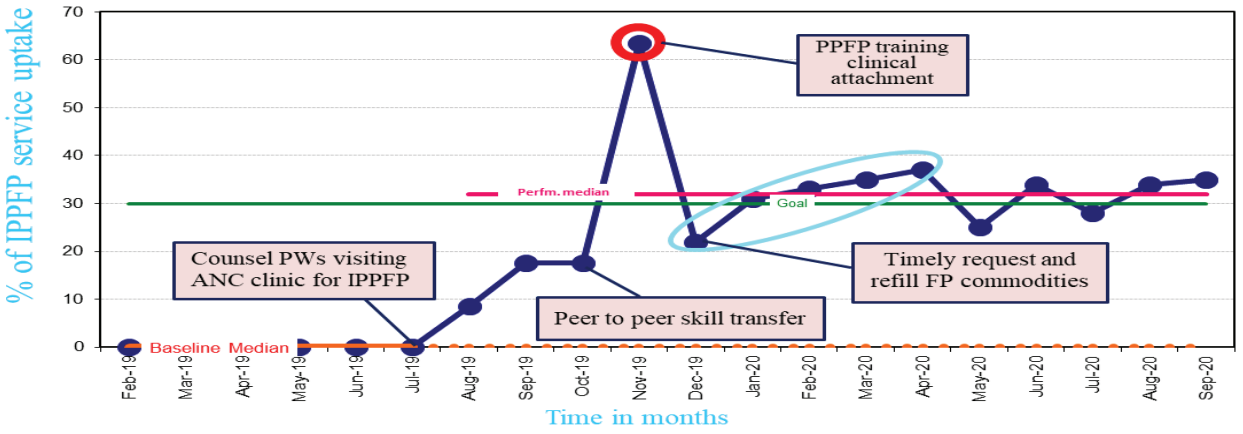
Result:

The facilities selected change ideas and tested one at a time using Plan, Do, Study and Act (PDSA) cycle. The QIT decided and tested: on job training through peer-to-peer skill transfer; timely requesting & refilling contraceptive commodities; provide counselling to all women as per standard (REDI) and conduct community forum on monthly basis. Following the stepwise intervention of these change ideas, IPPFP service up-take was increased from 0% to 25% in Derba, 0% to 35% in Chancho, 0% to 57% in Gorfo and 0% to 69% in Duber. The median score also improved from the baseline 0% to 15% in Derba, 0% to 32% in Chancho, 0% to 47% in Gorfo and 0% to 64% in Duber respectively. The run chart shows significant improvement which complies with run chart rule 1 (shift) in Derba & Gorfo; rule 2 (trend) in Chancho & Derba; and rule 3 (rule of run) in Duber. The interpretation from run chart exhibited that the tested change ideas by the projects were brought signal of changes.

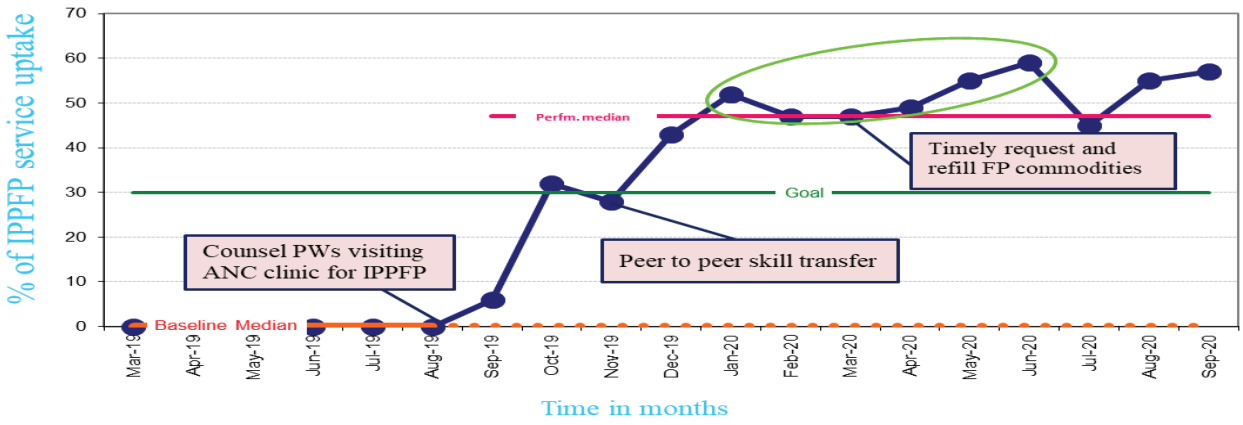
Figure 3. Trend of IPPFP service up-take at Derba, Chancho, Gorfo and Duber HCs, Sululta district, F/S/Z, Oromia.



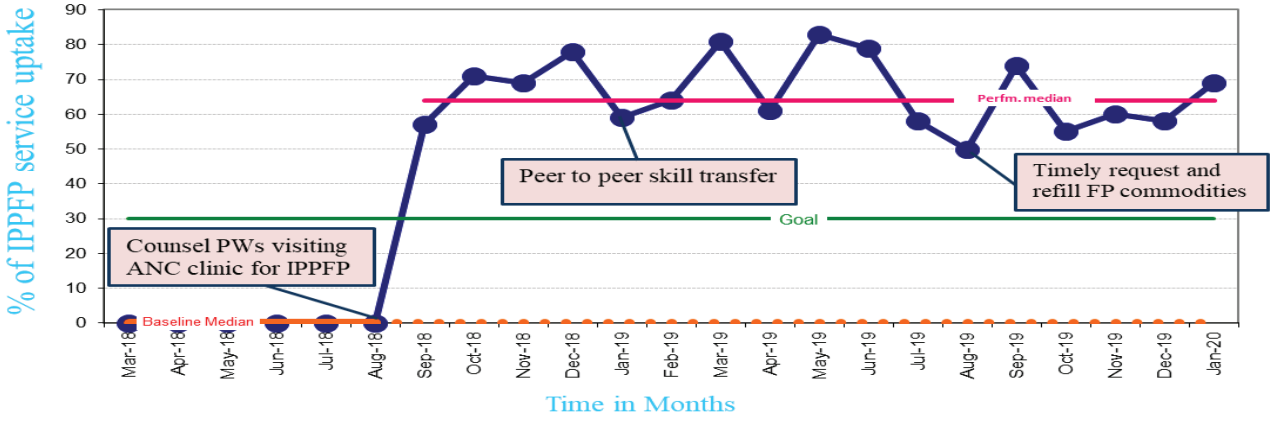
Trend of IPPFP service uptake in Chancho HC from Feb , 2019 to Sept, 2020



Trend of IPPFP service uptake in Gorfo HC from Mar, 2019 to Sept, 2020



Trend of IPPFP service uptake in Duber HC from Mar, 2018 to Jan, 2020



Discussion:

Following the introduction of interventions by stepwise, the pattern of data on run chart depicted nonrandom signal (shift-rule one) in all health facilities compared to baseline median. Which means, all data points were above baseline median at each facility. Immediately after introduction of the first change idea, the data pattern was crossed goal line in Gorfo & Duber HCs within 1 to 3 months. The synergetic effect of change ideas introduced one by one was made the pattern of data points remain above the baseline media and to comply with one or more run chart rule. So, we were supported the facilities and the woreda health office to continuously implement those change ideas as well as to draw lesson for others and to spread with the woreda.

Lesson learnt:

Involving Health Facilities leaders in QI project helped to generate doable change ideas using available facility resource for improving the gaps in their catchment area.

Providing QI orientation for all staff in in respective facility and clarifying their specific roles in the QI process was contributed for the achieved outcomes.

Frequent mentoring and coaching support to QI teams plays a great role in maintaining team spirit and motivating team to test different change ideas to achieve their desired goals.

Conclusion and Recommendation:

PPFP service uptake increased significantly by applying MFI which could result in reducing unwanted pregnancy, unsafe abortion and related complications. This shows that there is a need to continue with involving leadership, improving staff knowledge/skill with peer-to-peer skill transfer, mentoring/coaching support, timely requesting and availing contraceptive commodities and supplies, community engagement providing appropriate counseling and creating reliable data system. The project showed that health workers can apply MFI and use of data for decision-making to improve delivery of quality healthcare services. The quality improvement activities need to expand to other health facilities through collaborative learning sessions across health facilities to share their experiences and best practices in improving the quality of healthcare services.

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Reducing Surgical Site Infection in Woldia General Hospital in Amhara Region, Ethiopia

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Abstract

Background: The prevention of Surgical Site Infections (SSI) has become increasingly important, especially as the number of surgical procedures continues to rise. SSIs are an important threat to patient safety and the most common healthcare-associated infections (HAIs), accounting for 31% of all HAIs among hospitalized patients. SSIs can lead to increased hospitalization and postoperative stays, higher readmission rates, increased healthcare costs, as well as poorer health outcomes. In Woldia hospital, about 2,030 patients undergo surgical procedures each year and the prevalence of SSIs was 5%. The aim of this project was to reduce SSI at surgical ward in Woldia general hospital from 5% to 0 %.

Methods: The quality improvement (QI) team used a model for improvement to reduce surgical site infection at surgical ward.

Interventions: Strong leadership and ownership to reinforce the implementation of the SSI Bundle; build floor drainage system in each operation room (OR) and raise staff awareness about waste segregation based on IPC standards; add one OR table and place the autoclave near to the OR room; consistently monitor and periodic feedback for surgeons; provide educational session for all surgeons and patient; and orient all new surgical healthcare workers about SSI bundle during induction.

Result: Surgical site infections reduced significantly in Woldia general by applying MFI that result in reducing SSI associated morbidity and mortality. The percentage of SSI at surgical ward has significantly reduced from 5% to 0%.

Conclusion: Engaging all staff including surgeons in the prevention of healthcare-associated infections, strong ownership and commitment of QI team leadership to reinforce the implementation of the SSI Bundle, monitoring and orienting staff about SSI bundle regularly, periodic feedback for surgeons, and multidisciplinary effort are crucial to reduce SSIs and ensure sustainability.

Introduction

Surgical site infections (SSIs) are the most common health-care-associated infections in developing countries, but they also represent a substantial epidemiological burden in high-income countries. The prevention of these infections is complex and requires the integration of a range of preventive measures before, during, and after surgery. Due to poor infection prevention practices among health care facilities in low and middle-income countries, the incidence of SSI is substantially higher than in high-income countries.

SSIs are preventable complications following surgery and imposes significant burden in terms of patient morbidity, mortality and increased cost of treatment. Patients who develop SSIs are up to 60% more likely to spend time in an intensive care unit, 5 times more likely to be readmitted to hospital, and 2 times more likely to die compared with patients without SSIs. It accounts for 3.7 million excess hospital stay days, more than $1.6 billion excess costs annually and 3.57 extra drug use. The World Health Organization (WHO) and other studies indicated that periodic surveillance and feedback for surgeons on SSIs rate and associated factors can decrease up to 50% of cases.

Problem Description

Woldia General Hospital performs an average of 2,030 surgeries every year and the prevalence of surgical site infections was 5% at surgical ward in March 2012. The quality improvement project was designed to reduce SSIs from the baseline of 5% to a target of zero percent at surgical ward in Woldia general hospital.

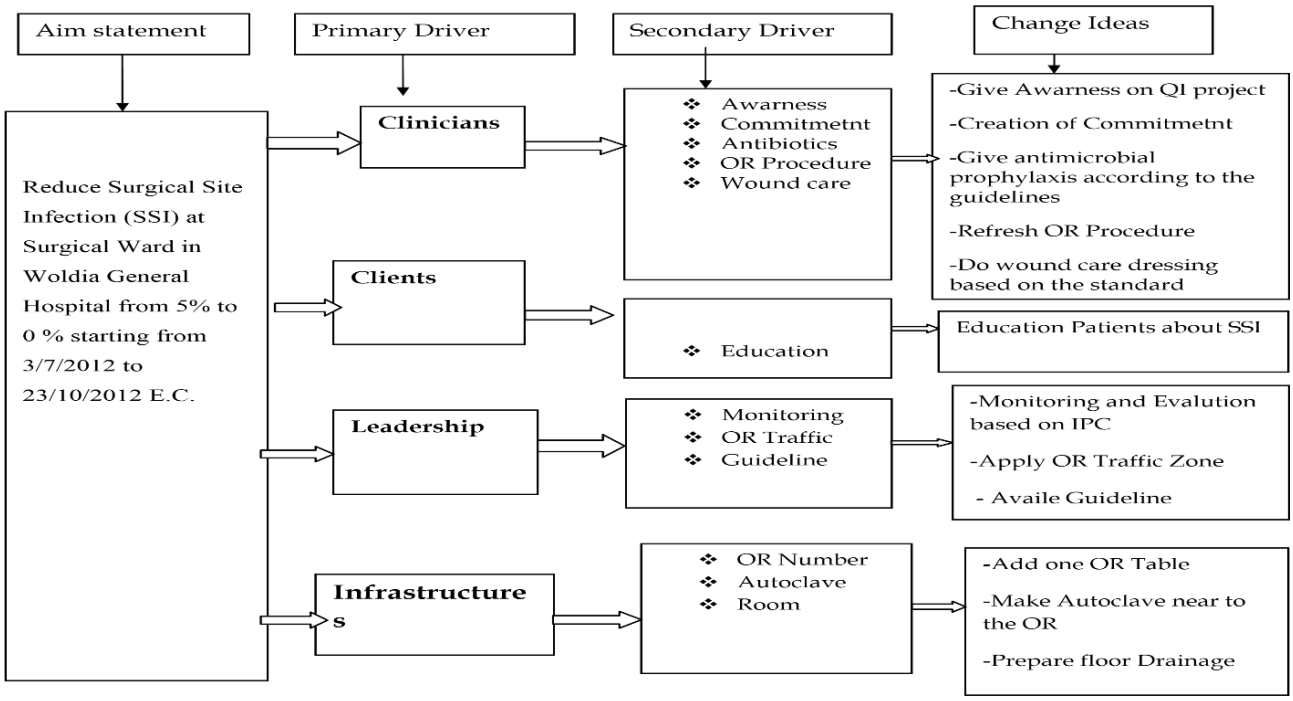
Description of Performance Gap

The past six months' performance showed that the prevalence of SSIs was 5%. Thus, the QI team identified the root causes by using fishbone diagram. Some of the root causes includes, limited knowledge of the recommended clinical practice guidelines and SSI bundle, implement the hospital-approved antimicrobial prophylaxis guidelines and monitor compliance ineffectively, lack of SSI bundle, intraoperative practice about surgical scrub and site preparation was not reviewed regularly, absence of preoperative education material for surgical patients, surgical specialties were not updated on SSI rate regularly.

Methods

The quality improvement (QI) team used a model for improvement to reduce surgical site infection at surgical ward.

Driven Diagram



Interventions

Strong leadership and ownership to reinforce the implementation of the SSI Bundle, build floor drainage system in each operation room (OR) and raise staff awareness about waste segregation based on IPC standards, do wound care dressing and provide antimicrobial prophylaxis according to the guideline, add one OR table and place the autoclave near to the OR room, consistently monitor and periodic feedback for surgeons, provide educational session for all surgeons and patient, and all new surgical healthcare workers were oriented about SSI bundle during induction.

Series of PDSA cycles repeated to test the change ideas one at a time. Each process was documented on the data collection tool for routine QI team meetings and improvement actions were taken. The progress of the project was monitored every week and the run chart was used to analyze the data collected over time with annotation of the interventions.

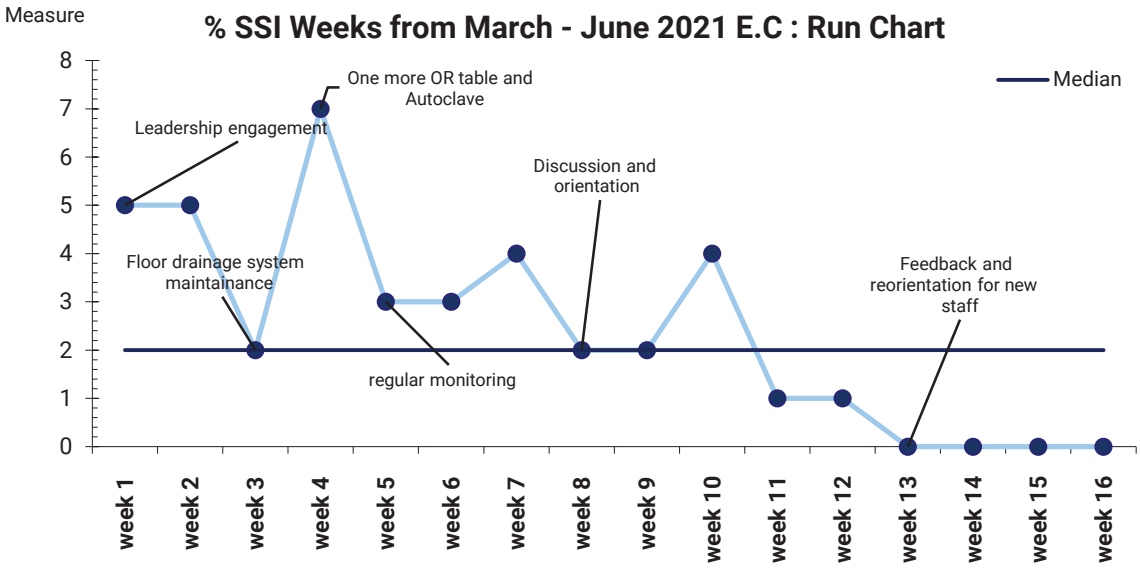
Measures

Outcome measure:

- The proportion of surgical site infections at surgical ward

Process measures:

- The proportion of patient's chart audit conducted
- Number of surgical and OR staff trained on SSI
- Number of surgical and OR staff monitored and updated on SSIs rate regularly



Results

After the intervention (MFI), the percentage of SSIs at surgical ward reduced from 5% to 0%. The run chart exhibit strong special causes and consistent with a decreasing percent of SSIs.

Conclusion

Surgical site infections reduced significantly in Woldia general by applying MFI that result in reducing SSI associated morbidity and mortality. Engaging all staff including surgeons in the prevention of healthcare-associated infections, strong ownership and commitment of QI team leadership to reinforce the implementation of the SSI Bundle, periodic feedback for surgeons, monitoring and orienting staff about SSI bundle regularly, and multidisciplinary effort are crucial to reduce SSI and ensure sustainability.

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Reducing Antenatal Dropout at Lalibela HC, South Achefer Woreda Amhara Region.

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Background: Within the continuum of reproductive health care, antenatal care (ANC) provides a platform for important health-care functions, including health promotion, screening and diagnosis, and disease prevention. It has been established that by implementing timely and appropriate evidence-based practices, ANC can save lives. But 2019 mini-demographic and Health Survey (Mini EDHS) result showed that only 43% and 50.8% of women who gave birth in the 5 years preceding the survey had four or more ANC visits for their most recent live birth in Ethiopia and Amhara region respectively. Lalibella Health center is one of the learning facilities for the MNH QOC initiative working to improve the care provided for mothers and newborns. During the second quarter of 2011, antenatal dropout in Lalibella health center was 21% which could be associated with the high still birthrate (1.6%) and maternal complications (12%) in the facility. So, the health center quality improvement team aimed to improve antenatal care dropout rate from 21% to 10% among ANC clients.

Methodology: The QI team conducted self-assessment/clinical service quality audit using national MNH quality audit tool for health centers; identified and prioritized gaps; and developed a QI project on improving the ANC service by applying continuous QI using the Model for improvement. Accordingly, on job training through peer-to-peer orientation, using tracer box, peer to peer discussion after analyzing tracer box, conducting monthly pregnant women conference, involving HEWs support in defaulter tracing were the identified change ideas that were tested. The team has used the run chart to plot and monitor data on monthly basis.

Result: After the QI project, antenatal care drop-out has decreased from 21% on to 10%. The run chart showed significant improvement indicating that the tested change ideas by the project were effective.

Conclusion: Antenatal drop-out rate has decreased significantly by applying MFI which could result in reducing still birth rate, maternal and neonatal complications. This shows that there is a need to continue with peer-to-peer education, use of tracer box, analyzing the data from tracer box regularly, involving HEW to trace defaulters, and community education through community pregnant women forum as part of the system for sustainability of the result obtained.

Key words: ANC drop out, Quality improvement project

Introduction

Mini-demographic and Health Survey (Mini EDHS) 2019 result showed that only 43% and 50.8% in women who gave birth in the 5 years preceding the survey had four or more ANC visits for their most recent live birth in Ethiopia and Amhara region respectively. Lalibella health center, during second quarter of 2011, antenatal dropout was (21%) which could be associated with high still birthrate (1.6%) and maternal complications (12%) So, the health center quality improvement team aimed to improve antenatal (ANC1 /ANC4) dropout rate from 21% to 10% among ANC 1 clients.

USAID Transform: Primary Health Care project, is working with the public sectors to drive large scale improvement in MNCH area. As part of the MNCH activities, antenatal care service uptake through continuous quality improvement has paramount importance in improving maternal and neonatal health. In Lalibella health center, antenatal dropout rate was 21% which contributed to maternal and neonatal health problems.

Project Aim: To reduce Antenatal care dropout rate from 21% to 10% among ANC 1st clients starting from January 1/2019 to January 30/2020, in Lalibela HC, West Gojjam.

Methods

Lalibella health center established QI team and sub-QI teams in different service delivery units. Then the QI team conducted self-assessment/ clinical service quality audit using national MNH quality audit tool for health center. The self-assessment revealed several problems, of these QI teams prioritized ANC dropout from 21 % to 10%. The quality improvement team in the health center developed problem statement, set an aim, analyzed root causes using fishbone, generated change ideas using driver diagram and set proper indicators to measure and monitor the changes accordingly. Using the PDSA cycle, generated change ideas were tested. During the testing period data was collected on monthly basis from registers (source document) and monitored by plotting on run chart.

Change Ideas (Interventions):

The QIT decided and tested the following change ideas; on orientation of staffs on QI and ANC dropout rate, avail logbook for appointment registration and defaulter tracer box, regular data analysis using the defaulter tracer box, working with HEWs in tracing defaulter regularly, QI coaching and mentoring and Community education through community conference

Figure 1. ANC drop out tracing box at Lalibela HC.

Outcome Measure:

- % of ANC dropout from ANC 1 to ANC 4

Process Measures:

- Number of staffs who received on job

training through peer-to-peer skill transfer.

- % of women who were traced through defaulter tracing
- Number of community forum conducted for educating the community

Analysis:

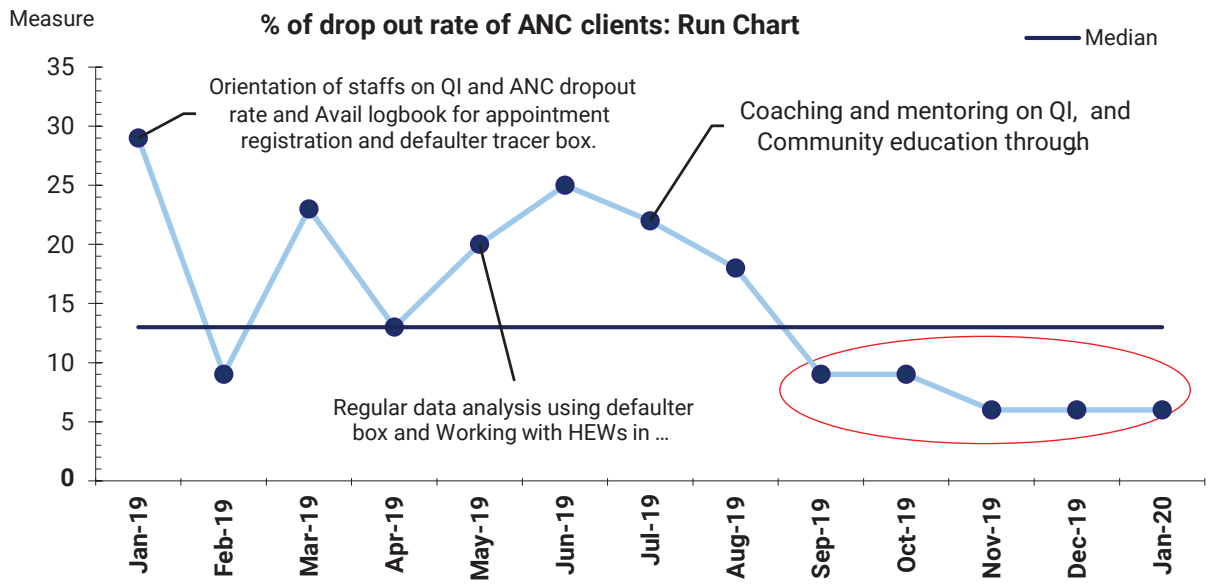
The progress was monitored using data collection and plotting it against over time. Data was collected on monthly bases and the run chart was used to analyze data collected over time. Repeated PDSA cycles were used for testing the change ideas. Each process was documented on data collection tool for routine QI team meeting and the corrective actions taken accordingly.

Results:

The health center selected change ideas and tested one at a time using Plan, Do, Study and Act (PDSA) cycle. The QIT decided and tested; on orientation of staffs on QI and ANC dropout rate, avail logbook for appointment registration and defaulter tracer box, regular data analysis using the defaulter tracer box, working with HEWs in tracing defaulter regularly, QI coaching and mentoring and Community education through community conference

Following the intervention of these change ideas, the team has managed to reduce antenatal care dropout rate. The last one-year data shows that the antenatal care dropout rate has decreased from 21% on January/2011 to 6% on November/2012 and the run chart shows significant improvement indicating that the tested change ideas by the projects brought signal of changes. While implementation of this QI project in the health center the team has also observed improvement on the quality MNH service and health outcomes such as Institutional delivery has increased from 53% to 69%; decrease still birth rate from 9 (20.9%) to 1(8%) and maternal complication from 12% to 5%.

Figure 2: Run chart for reducing Antenatal care dropout, Lalibella Health center Jan.1, 2019 to Jan. 30, 2020



Lesson learnt:

Engaging Health Facilities leaders and frontline health workers in QI project helped in generating doable change ideas using available resource for improving the gaps in their catchment area. Enhancing capacity of the service providers through trainings, frequent mentoring and coaching support to QI teams are the key factors in maintaining team spirit and motivating team to test different change ideas to achieve their desired goals. Developing doable change ideas, small testing, implementing those change ideas, and follow data regularly and use data for decision making in collaborative has been important for continuous quality improvement.

Conclusion and Recommendation:

Antenatal care dropout has decreased significantly by applying the interventions: orientation of staffs on QI and ANC dropout rate, availing logbook for appointment registration and defaulter tracer box, regular data analysis using the defaulter tracer box, working with HEWs in tracing defaulter regularly, QI coaching and mentoring and Community education through community conference MFI which resulted increasing institutional delivery and reducing still birth rate, maternal and neonatal complications. This shows that there is a need to continue with doable and locally generated change ideas as part of the system for sustaining the achievement. The quality improvement initiative needs to expand to other the health facilities through the collaborative learning network with health facilities by fostering peer to peer learning in improving the quality of healthcare services.

Decreasing Neonatal Mortality Linked to Quality Improvement Interventions at Assosa General Hospital, Benishangul Gumz Region, Ethiopia

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Abstract

Background: Death occurring in the first 28days after birth is defined as neonatal death. Although the neonatal death figure globally has shown improvement in the past two decades, a significant number of children still die before they complete their 28days. Of these the majority of deaths are recorded in developing countries like Ethiopia. In Asosa general hospital the data obtained for the past 8month showed a high NMR of 45death per one thousand live births. Preterm birth and PNA account for the majority (around 70%) of neonatal deaths happening in the hospital. The QI team has therefore designed a QI project with the aim of decreasing the NMR at Asosa general hospital by half.

Method: The science of quality improvement using the model for improvement framework was applied to identify causes, generate change ideas, test the interventions, and study the result over time.

Interventions: Onsite coaching and mentorship and follow up to health workers, peer-to-peer support on proper monitoring and application of phototherapy, assigning experienced health workers (HWs) with less experienced HWs, instating visiting hours and restricting access to parents to NICU , applying Kaizen model to redesign and manage space in the NICU, Establish hand washing corners with continuous soap and water supply from a reservoir water tanker, and avail necessary medical equipment that are required at NICU.

Results: following the testing and implementation of change ideas the NMR at Asosa general hospital decreased significantly even beyond what was aimed: form a baseline of 45 per 1000 live births to 20per 1000 live births.

Conclusion: Redesigning NICU as per standard with regular onsite clinical mentorship and coaching sessions that were reinforced with peer-to-peer support and skill transfer achieved by pairing experienced health care workers with less experienced ones and partners' collaboration for resource mobilization locally have contributed to the significant reduction of neonatal death.

Introduction

The 28 days following birth are seen as a crucial time in a child life as this is the time the child faces the greatest risk of death. Death occurring in the first 28days after birth is defined as neonatal death. Although the neonatal death figure globally has shown improvement in the past two decades, a significant number of children still die before they complete their 28days. Of these the majority of deaths are recorded in developing countries like Ethiopia. Globally, the major causes linked with neonatal deaths are Infection (36%), preterm birth (28%) and birth asphyxia (23%). Similarly studies conducted in our country have determined the neonatal death to be significantly high. Ethiopian Demographic and Health Surveys reported that neonatal death was increased from 32% in 2005 to 43% in 2016 while the rate was found to be 29/1000 live births.

Problem Description

Benishangul Gumuz regional state has the second lowest performance indicators of under-five mortality out of the 9 regional states. The regions under-five mortality rate according to the 2016 EDHS report was 98 deaths per 1000 live birth. In Assosa General Hospital (AGH), there are high rates of early neonatal morbidity and mortality. On average, in EFY 2011/12, per month, 52 neonates are admitted to the AGH's NICU (Neonatal Intensive Care Unit) with the major admission causes including prematurity, perinatal asphyxia and sepsis.

The data obtained for the past 8month showed a high NMR of 45death per one thousand live births. Using Pareto chart, we identified the major causes of neonatal death in the hospital for the specified time period. As shown on the graph, Preterm birth and PNA account for the majority of neonatal deaths. The USAID Transform: Health in Developing Regions (USAID T-HDR) project supported health workers in AGH and other public health facilities in Benishangul Gumz to institutionalize quality improvement approaches to tackle the alarming rate of neonatal complications and deaths. Problem analysis was done using fishbone analysis method to reach the underlying root causes of high NMR. The factors identified are illustrated in the fishbone diagram below.

Figure 1. Pareto Chart Depicting the Major Causes of Neonatal Deaths in AGH

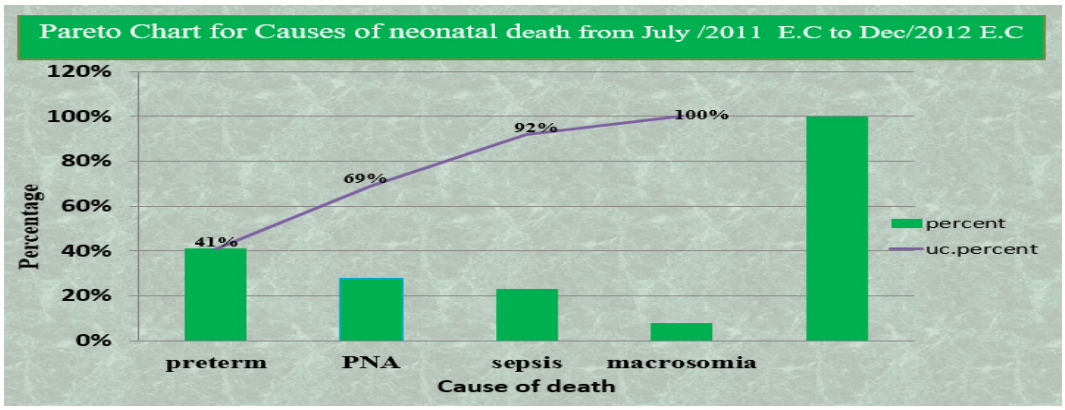
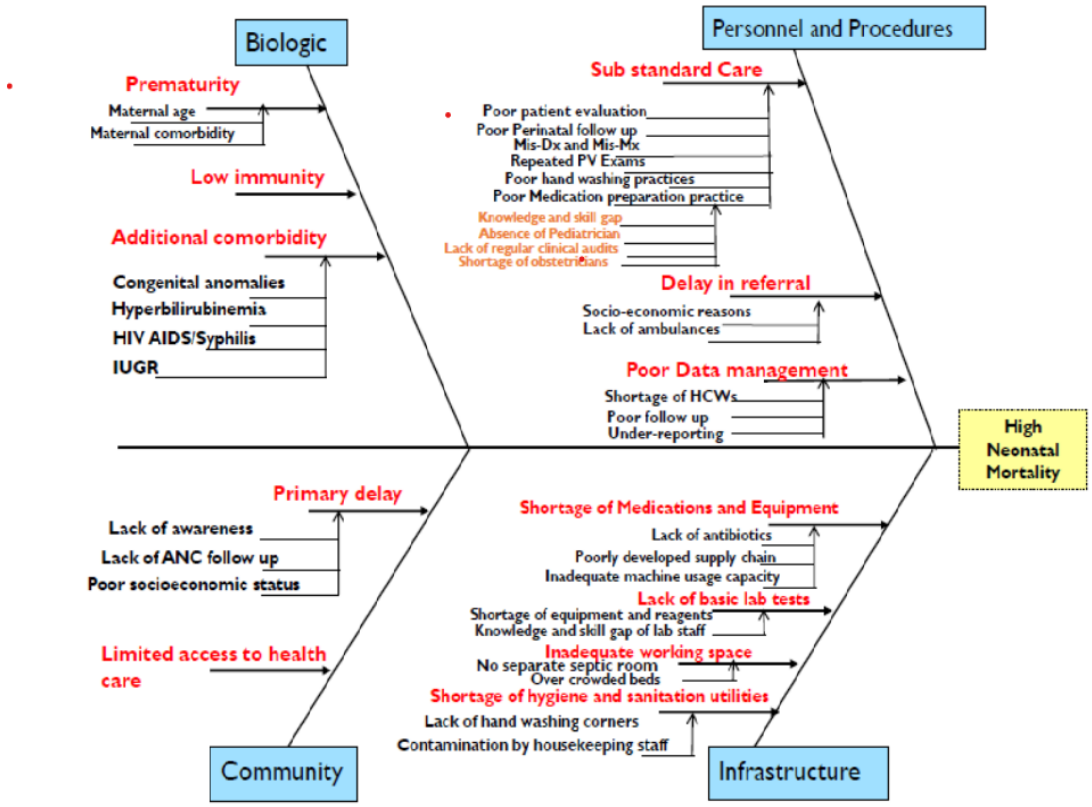


Figure 2. Root cause analysis, Fishbone



Aim

This QI project was designed with the aim of reducing neonatal death by 50% (from 45 per 1000 live births at April 2019 to 23 per 1000 live birth on Dec 2020) from April 2019 to Dec 2020.

Method

The science of quality improvement using the model for improvement framework was applied to identify causes, generate change ideas, test the interventions and study the result over time.

Interventions of the Project

USAID Transform HDR provided rounds of training on NICU, QI, and clinical mentorship and coaching to 5 health workers in the hospital using standardized national and WHO guidelines. The trained health workers were assigned at NICU to overcome the shortage of skilled human power for neonatal care. Every two to three weeks, health workers at AGH recorded data related to routine care alongside data on neonatal deaths. A total of 7,447 babies were delivered in the hospital during the QI intervention. For six consecutive months, onsite coaching to health workers was given by selected experienced midwifes, neonatal Nurses and pediatricians from the hospital. They spent a week in the facility each month and provided QI coaching every two months in collaboration with RHB and USAID Transform HDR. They focused on neonatal case management including KMC, nutrition, newborn resuscitation, respiratory care, and early detection and treatment of

common complication. Kaizen model applied to redesign and manage space in the NICU and close the distance b/n delivery and NICU. Senior staff of the facility provided technical Support to NICU staff on proper monitoring and application of phototherapy through peer-to-peer support. To avail necessary equipment that required at NICU which were identified during root cause analysis, Transform-HDR Activity made available oxygen concentrators, Incubators, neonate beds, radiant warmer, pulse oximeter, autoclave, personal protective equipment (PPE) and BP apparatus for standardizing NICU. The facility also instated visiting hours and restricted access to parents to NICU. Resources mobilized by engaging key partner, Pharo Foundation, to refurbish the NICU block. In addition, peer-to -peer learning established, and those experienced health workers (HWs) assigned with less experienced HWs in daily basis at NICU. Five Neonatal nurses and midwives received on-site training on phototherapy machine use. A total of 7,447 babies were delivered in the hospital during the active QI interventions.

Table 1. Prioritized Root Causes and Interventions

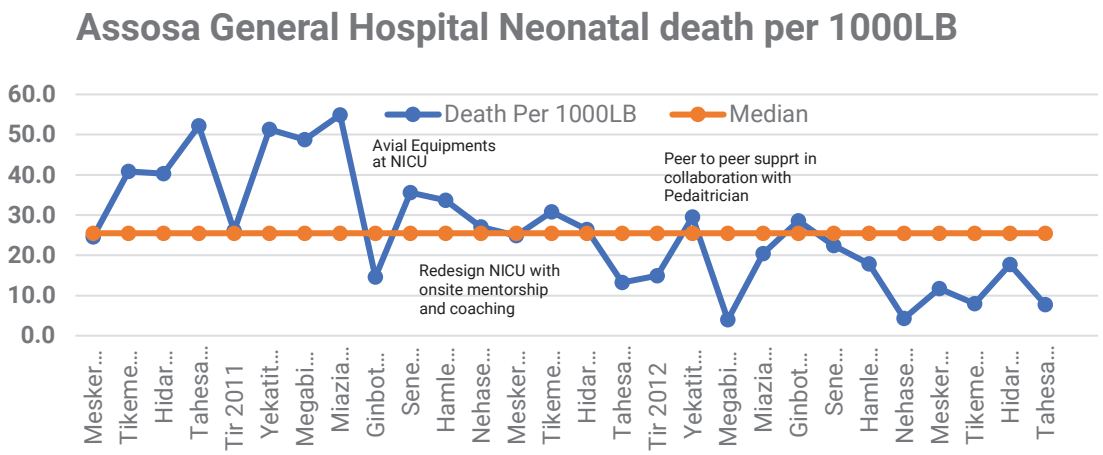
Root causes	Interventions
Poor patients follow up, delay in decision making, poor commitment	onsite coaching and mentorship and follow up to health workers
NICU far from labor ward	Apply kaizen model to redesign and manage space in the NICU
Skill gap in performing phototherapy	Peer-to-peer support on proper monitoring and application of phototherapy
Shortage of medication and equipment	avail necessary medical equipment that are required at NICU
NICU over crowding	Instate visiting hours and restrict access to parents to NICU
Skill gap	assigning experienced health workers (HWs) with less experienced HWs
Shortage of sanitation and hygiene utilities	Establish hand washing corners with continuous soap and water supply from a reservoir water tanker

Measure

- Outcome measure - Neonatal mortality rate

Results

By plotting the data on a run chart, the result of tested change ideas was monitored and studied overtime. With new equipment donated by Transform-HDR and additional block for NICU built by PHARO Foundation, the distance from delivery room reduced from 60m to 8m. This has resulted in improving the quality of service by minimizing crowding and created more space in the unit helping reduce facility-acquired infection. The unit has hand washing corners with continuous soap and water supply from a reservoir water tanker established for NICU and also functional bathroom.



Following onsite phototherapy machine training to NICU Health Workers, the referral cases of the hospital for phototherapy treatment reduced significantly and have direct effect on reducing opportunity costs of clients. Besides, separate KMC corner established for caring 15 low birth weight baby and Personal Protection Equipment (PPE) used by health workers for infection prevention. The trained health workers together with onsite mentor pediatricians provided care to 200 sick neonates using the treatment protocol at NICU. These include early detection of cases, premature baby care, resuscitation, sepsis treatment, vital sign monitoring and infection prevention. During the QI intervention, there was a significant reduction in the neonatal death from the highest record of 55 deaths per 1000 live births seen in the month of April 2019 to 7.7 per 1000 in Dec 2020. Following the testing and implementation of change ideas the NMR at Asosa general hospital decreased significantly even beyond what was aimed: form a baseline of 45 per 1000 live births to 20per 1000 live births.

Lesson learnt

It was learnt that reducing the distance between delivery room and NICU helped in keeping the crowding of the rooms in NICU to a bare minimum which in turn played role in the decrement of hospital acquired infections. We also understood that in addition to overcoming the medical coast of unnecessary referrals of neonates to other faculties for phototherapy, the peer-to-peer skill transfer on phototherapy treatment application has a positive effect towards the reduction of opportunity costs to clients. Moreover, the successive mentoring and coaching sessions provided by senior HCWs contributed to the increased practice of early case detection, effective neonatal resuscitations, sepsis management, and successful vital sign monitoring and decision making, all of which in turn contributed to the reduction in institutional neonatal deaths

Conclusion

Redesigning NICU as per standard with regular onsite clinical mentorship and coaching sessions that were reinforced with peer to peer support and skill transfer achieved by pairing experienced health care workers with less experienced ones and partners' collaboration for resource mobilization locally have contributed to the significant reduction of neonatal death.

Improving Early Postnatal Care Linked to Quality Improvement Interventions at Nefas Silk Lafto Woreda 3 Health Centre

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Abstract

Background: Early postnatal care (PNC) within the first 24-hour after delivery is very critical to detect and manage perinatal complications and prevent deaths. Ethiopia has adapted the new WHO guidance of keeping post-partum mothers for 24-hour at the health facility. However, the postnatal care in Nefas Silk Lafto Woreda 3 Health Center was sub-optimal. A baseline assessment showed that only 7% of the postpartum mothers received all the component of early PNC service.

Methods: The quality improvement team analyzed the root causes for the sub-optimal PNC and came up with the following change ideas, which they tested as of November 2019.

Interventions: following rout causes analysis the following changes were made including, Provide orientation on the new guideline, Advocate for additional postnatal beds to enable mothers stay for 24 hours postpartum, Prepare counselling checklist for providers, Post key messages on breastfeeding, family planning, cord care etc. on the postnatal room, Engage family members and mostly husbands in the counseling process, Develop PNC protocol and Avail adequate thermometer.

Result: Proportion of postpartum mothers and newborns dyad who received all the component of PNC increased from 7% at baseline to 80% after eight weeks of implementation of the interventions. The most challenging intervention to implement was to keep the mothers and their newborns at the health facility for 24-hours while temperature monitoring of the newborn every two hourly was done every time.

Conclusion: Introducing the comprehensive component of postnatal care helped in the proper evaluation and timely detection of complications at our health centre.

Background:

Most maternal and neonatal deaths occur in the first week of birth. A third of neonatal deaths occur on the day of birth and close to three quarters on the first week of life. Thus, early postnatal care (PNC) for both the mother and the newborn is important to treat any complications arising from delivery. It also provides a great platform to inform the mother on how to care for herself and her newborn during this critical time. However, PNC for both newborns and mothers is the least prioritized program component of maternal and child survival interventions.

In Ethiopia, only 17% of women received a PNC within two days of delivery (DHS, 2016). In 2019, PNC within two days have almost doubled to 32% (mini-DHS, 2019). Taking the importance of this service and the new guidance of WHO to keep mothers at health facility for 24 hours postpartum, Ethiopia has revised the PNC guideline in 2018. HSTP II also set a target to increase coverage of early PNC (within two days) from 32% to 76% by 2025.

Similar to the national situation, the postnatal care in Nefas Silk Lafto Woreda 3 (NSLW3) health center was assessed by the quality improvement team as sub-optimal.

Problem description

Based on a baseline assessment the quality improvement team (QIT) conducted using a locally developed PNC service provision assessment tool, only 7% of the postpartum mothers and newborns received all the component of early PNC service.

The PNC components considered in the assessment include:

1. Assess the newborn for danger signs
2. Assess the mother for danger signs
3. Counselling on early initiation and exclusive breastfeeding, bonding and cord care
4. Counselling on post-partum family planning
5. Keeping post-partum women for 24-hour in the health facility
6. Keeping the new-borns warm and monitoring its temperature

The QIT observed that there were neonatal complications. For example, there were three hypothermia related referrals which could have been prevented by improving the newborn care at the health center.

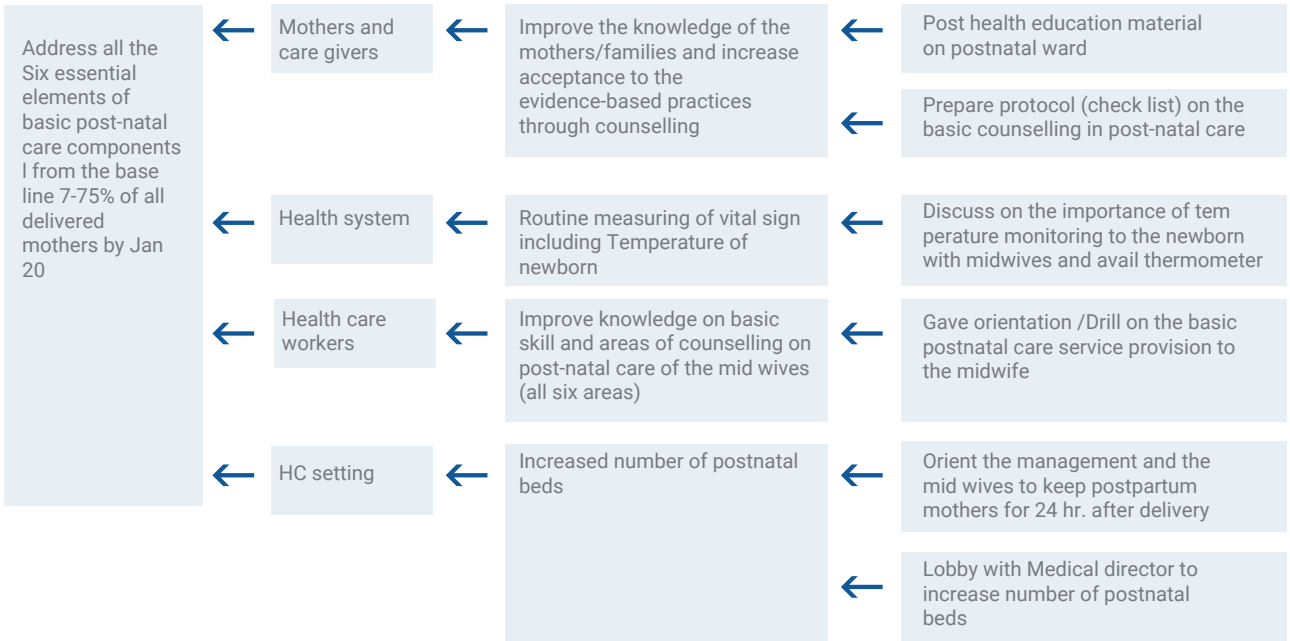
During client exit interview, 30% of the mothers were not able to recall key messages that they should have received through counselling. These include cord care, optimal breastfeeding practices, importance of keeping the baby warm etc.

Taking these findings into considerations, the QIT designed a project by listing change ideas/ interventions that could address the identified gaps (Figure 1).

Table1. List of problems and respective change ideas generated

Identified problems	Proposed change ideas/interventions
Neither the health providers nor the management were aware of the revised PNC guideline	Provide orientation on the new guideline
	Advocate for additional postnatal beds to enable mothers stay for 24 hours postpartum
Mothers were not counselled adequately	Prepare counselling checklist for providers
	Post key messages on breastfeeding, family planning, cord care etc. on the postnatal room.
	Engage family members and mostly husbands in the counseling process
Most mothers and newborns were not assessed for danger signs or had their vital signs taken.	Develop PNC protocol
	Avail adequate thermometer

Figure 1. Driver diagram showing PNC system PNC at NSLW3 Health Center



Generated Changes Under Team Influences

Prepare power point presentation on basic components of postnatal service

Prepare postnatal care protocol

Discuss with the health center heads and all staffs in the MCH clinic on the importance of temperature monitoring every two-hourly, to detect hypothermia early as per the PNC guideline.

Calibrate and supply adequate thermometer

Develop and post key messages on danger signs of the mother and the newborn, on family planning and optimal breastfeeding at the postnatal room,

Advocate for additional postnatal beds by discussing the revised guideline with the medical director

Give orientation to all midwives on good counselling technique and standardize counselling by using a checklist

Engage family members and mostly husbands in the counseling process

Method/interventions:

These change ideas were introduced in November 2019. We provided orientation and training on the comprehensive components of PNC to all the midwives. We emphasized the importance of keeping postpartum mothers for 24-hour at the health facility. We also developed a protocol to this effect. We then availed the protocols and manuals at the postnatal ward. This includes the newly revised 24-hour postnatal stay guideline. We supplied adequate thermometer to ensure temperature monitoring of the newborns every two-hour. We prepared locally printed materials containing important information regarding postpartum care including identification of complications and pre-referral management on selected cases. Eight additional postnatal beds were added making the total available postnatal beds 14 to enable postpartum mothers stay at the health centre for 24-hour.

We monitored service provision on weekly basis using Run charts and appropriate process and outcome indicators.

Results and Discussion:

Nearly all mothers who attended postnatal follow up at the health centre received the six components (median= 80%, Figure 2). Staying for 24 hours at the health facility is the only component which showed slow progress, while the remaining components were provided to every postnatal mother and baby (Figure 3).

Figure 2. Proportion of postnatal mothers who received all the six components

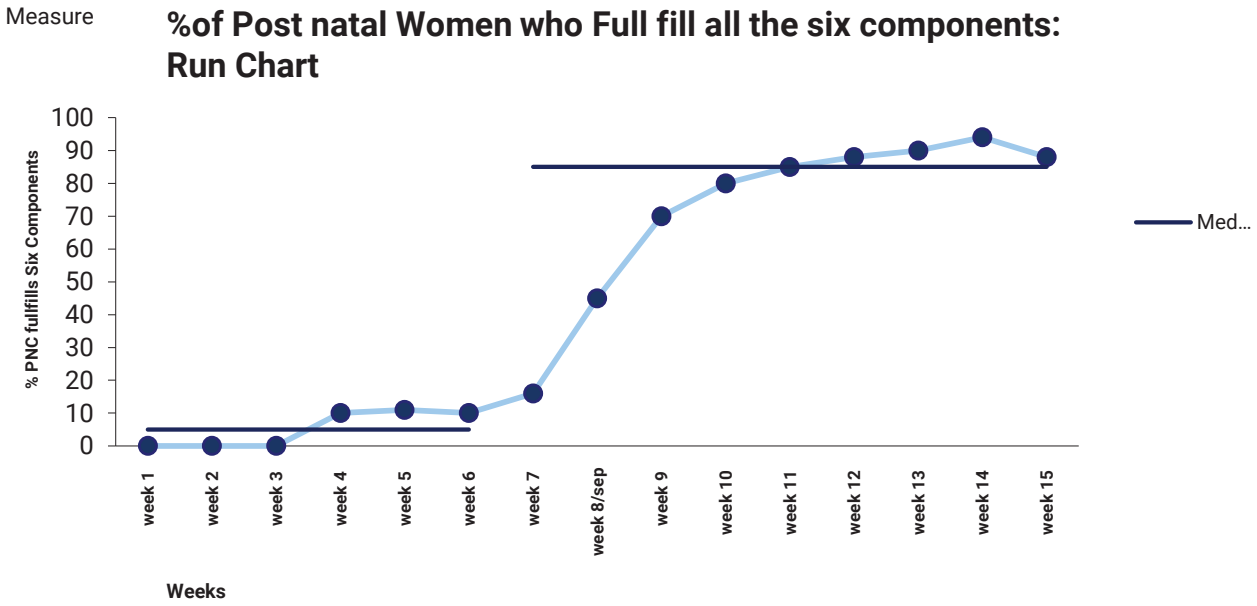
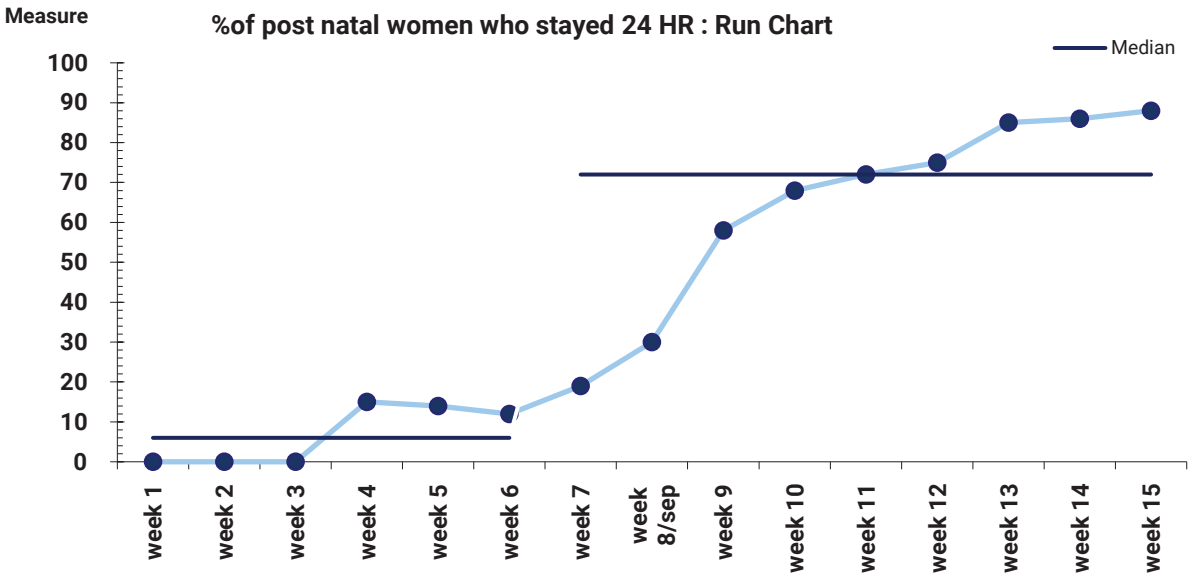
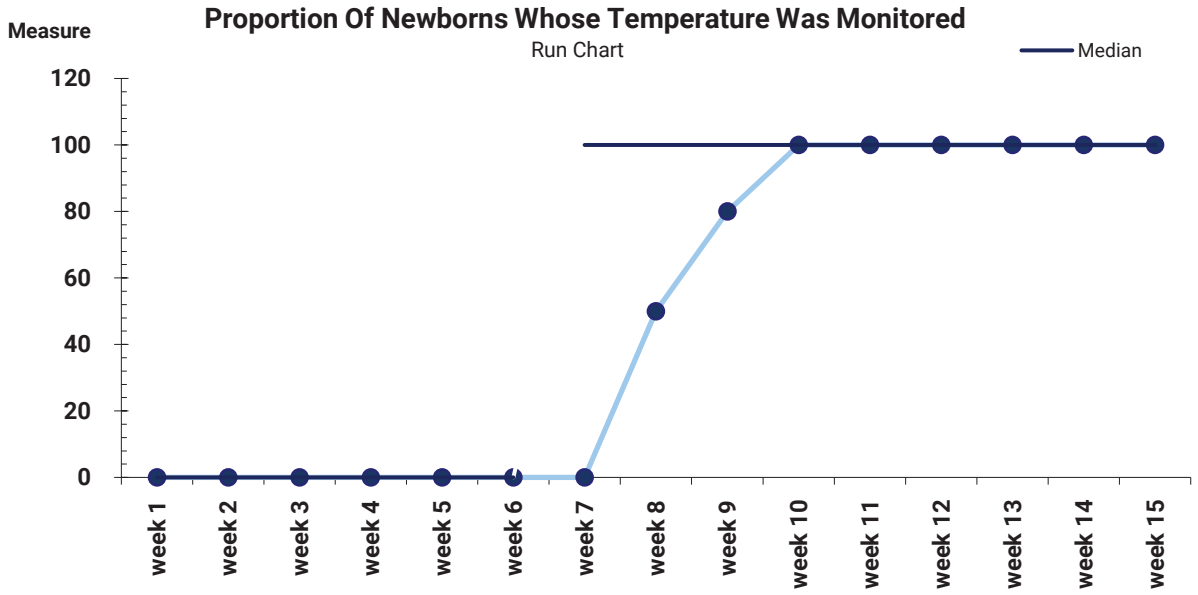


Figure 3. Proportion of mothers who stayed for 24 hours in the facility



In addition to the 24-hour stay at the health facility, temperature monitoring was taken as a key service component among the others, since this component was not practiced at all prior to the intervention. This showed significant increment following the intervention as shown in Figure 4, temperature is now being monitored for every new-born.

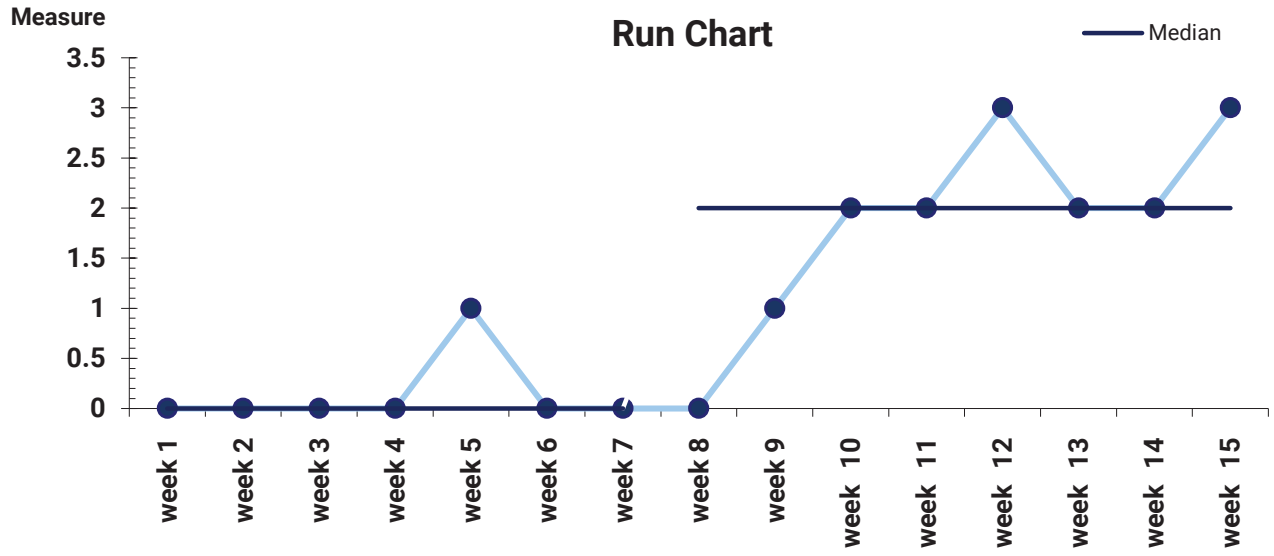
Figure 4. Proportion of new-borns whose temperature was monitored and documented



Our postnatal referral chart review showed that there was no complication detected or referral made neither for the mothers nor for the babies during the past two months. This might be due to early referral of high-risk mothers during ANC and at the time of delivery. In addition, the frequent vital sign monitoring and the counselling provided might have helped in preventing complications such as hypothermia.

The team also observed a significant increment on acceptance of post-partum intrauterine contraceptive device (IUCD) insertion (Figure 4).

Figure 4: Number of mothers who received post-partum IUCD



Even if the number of IUCD insertion showed significant increment, there were two mothers who came back for IUCD removal. These mothers were influenced by rumours from the community that IUCD leads to infertility and that it may ascend to the abdomen. Which clearly indicate the need to clear such myths and misconceptions through health education and counselling.

Lessons Learnt

The QI team learnt that be extending the time that postpartum mothers stayed at the health centre from six to 24 hours provided adequate time for monitoring and close follow-up of the mothers and their new-borns. Temperature monitoring and early exclusive breastfeeding resulted in reduction of neonatal complication mainly hypothermia and hypoglycaemia (where there was no report of such cases in the project implementation period.)

The team observed that involving family members and husbands during postnatal counselling was a very crucial step that should be considered to ensure acceptance by the mothers. Posting information on danger-signs, breastfeeding and post-partum family planning on the postnatal room was very important to inform expanded family members. The commitment of facility leaders and the head of the midwives on implementing and close follow-up of this QI was key for the success of this project. We (the QIT) concluded that this QI project on postnatal service can be expanded to other facilities with little modification based on the availability of bed and number of deliveries.

Improving Antenatal Care (ANC) Services in Semen health Centre, Addis Ababa, Ethiopia

Authors: Daniel nadew[1] , Sr Betelhim Tate[2], Dr Ali Ahmed[3]

Affiliates: 1. Semen health canter 2. Addis Ababa city health bureau, 3 World Health Organization

Abstract:

Problem: A 22-year-old women in her first pregnancy presented to the referral Hospital emergency room with abnormal body movements and raised BP. She was treated appropriately with Magnesium Sulphate and Nifidipine and transferred to ICU, but she died 24 hours after admission. She had had ANC at the local health center and had been seen at the health center two days before admission with a complaint of headache. She had been given analgesia and reassured. The Hospital MDSR/QI team reviewed this case and noted that this mother could have been saved if her BP was measured 3 days earlier when she visited the health center. The team identified that the ANC follow-up in that particular facility was sub optimal and provided written feedback. The MDSR/QI team at the health center reviewed the feedback and agreed that quality ANC service was a problem.

With this in mind the health centre QI team retrospectively assessed 45 ANC cases over a 7-week period using a random sampling technique, and assessed the quality of ANC using the following criterias,

- Proper History and Physical examination
- Provision of oral iron tablets,
- Measurement of blood pressure,

Counselling on danger signs

- Laboratory tests (HIV, UA, Hgb, VDRL, and RH)
- The assessment found the quality of ANC service to be 73%. The MDSR QI team aimed to improve this rate to 95% within 2 months.

Interventions:

- One day on-site revision of focused antenatal care was given. This was based on the national guideline and included orientation on all its relevant contents
- National ANC job aids and protocols were posted in the ANC clinic.
- An additional midwife was assigned to the ANC clinic

Result: after the interventions a total of 83 ANC cases were randomly selected from the ANC clinic at weekly intervals. The results showed that there is improvement in the quality of ANC

Conclusion and Lessons Learnt

The QI team learned that simple and low-cost interventions as described above can lead to a significant improvement in the quality of ANC service.

Limitations: Selected components of antenatal care were chosen in this quality improvement initiative. All components of ANC were not included (eg. HBSaG test, TT vaccination, Anti D and partner HIV testing

Problem statement

A 22 years old G1 P0 mother who have ANC follow up at Semen health centres did present to the health centre prior to her appointment date with head ache, the nurse gave analgesics and send her back, after two days she develop abnormal body movement and her families brought her to St Paulos hospital in which Eclampsia was diagnosed ,she took Loading and maintenance dose of Magnisum Sulfate and Nifidipine and transferred her to ICU, Despite the holistic ICU care the mother condition deteriorated and after one day of admission she passed away.

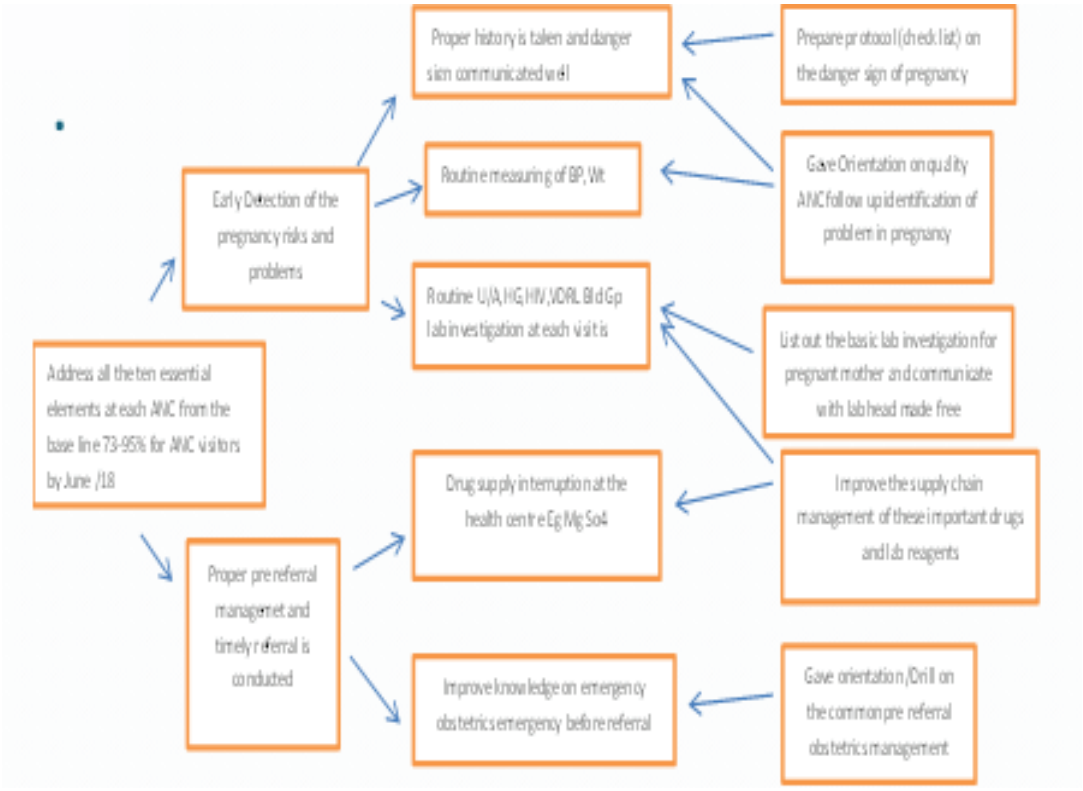
The hospital MDSR committee review this specific maternal death and the following pit falls were identified

1. Late Detection of the preeclampsia cases (late referral at ANC) like
   - No proper history taking and danger sign were not communicated
   - No routine measurement of BP
   - Routine lab investigation at each visit was not conducted e.g. U/A
2. Proper pre referral management was not conducted

Based on the developed checklist the base line of the quality of ANC utilization was 80% (see the design)

Seven week base line data was collected retrospectively by using systematic random sampling method and the median was 73% (Fig 2) .From the ten components ever one ultrasound was the major missed area followed by Iron folate supplementation and VDRL test interruption which was related to supply issue.

Figure 1 Driver Diagram



List/s prioritized change idea/s

- Availing obstetrics guideline
- Gave Orientation on quality ANC follow up identification of problem in pregnancy and timely referral
- Prepare protocol (check list) on the danger sign of pregnancy
- Assign role and responsibility like the lab and Pharmacy heads should regularly update their necessary stock and report weekly to the disease prevention hea
- Prepare a local printed material on pregnancy and delivery complication and ready ness
- Provide orientation and printed materials on complication identification and pre referral management for common selected obstetrics cases

Design

The test design used was time series testing design with data collection before and after the change. We collect all ANC charts in the week (Monday morning –sun day evening) that is served and calculate the percentage of the charts that all of the ten selected components were taken and documented in the last visits except ultrasound result in which one is enough. Based on the number of ANC load in the week charts will be selected using systematic random sampling methods. The stock out of drugs and lab regents in addition to the protocol that is given to the mothers are monitored weekly. of using skilled delivery, inadequate care during this time breaks a critical link in the continuum of care for the mother and the baby. During each ANC visits the mother should receive

The ten components were

1. History taking and health education (danger sign of pregnancy, skilled birth attendance, postpartum pregnancy)
2. Physical examination (taking blood pressure, weight), diagnosing preeclampsia and refereed after proper management
3. Laboratory testing (Blood group, Urine, HIV, VDRL ,HBsSG and hemoglobin) .
4. Anatomical screening at first ANC visit using routine US
5. Iron folate supplementation at first time
6. On chart review if any one component was missed the ANC visits categorized as not meet its standard

Measures

Outcome

Proportion of ANC charts with complete information on the basic/Standard components of care(mentioned in the back ground)

Proportion of the ANC referrals which is evaluated with timely identification of the problem, proper documentation and Pre referral management provided

Process

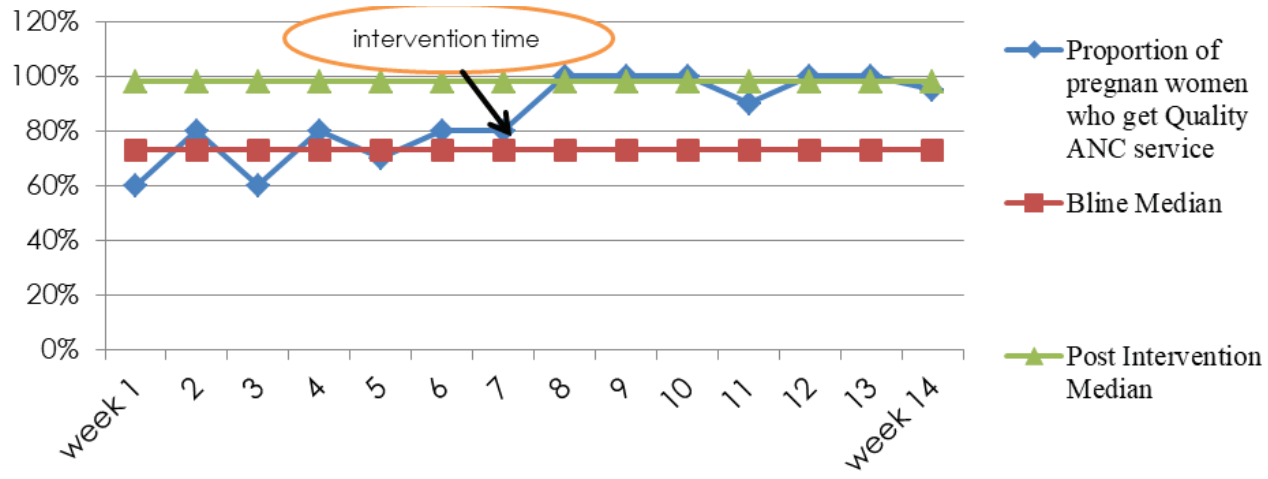
Proportion of ANC Mothers in which all the ten areas is taken and documented in the last visit

Proportion Mothers in which danger sign indication chick list (in Amharic) provided

Results

Result has been followed using run chart on weekly bases and the run chart showed non-random variation or shift (Figure 2). All of the ten components well addressed nearly to all mothers who attend ANC follow up at the health center except one client, who face difficulty to afford iron folate and the other client whose ultrasound is not done. Individual case study approach for the two exceptional cases revealed absolute poverty /lack of money/ was the reason for the two clients. Our referral chart review before the intervention showed that from the total referrals at ANC only 80 % meets standard based on timeliness and appropriateness of diagnosis. Just after intervention overall average of 96% of quality of referral was achieved. The common problem on referral at ANC is inability to timely detect high risk pregnancies' to be referred.

Figure 2. Proportion of ANC client who get all components of ANC servise at Semen HC , Mar-July 2019



Discussion

In this QI the team recognize that even if there was a problem in supply like Iron folate and ultrasound, this can be overcome by improving the counselling practice during ANC visit. At each visit the practice to use the annexed check list to council on danger sign brought a uniform and detailed counselling service given by all health workers attending ANC service.

After the orientation given to all mid wife's on early detection of high risk pregnancies, pre referral management of obstetrics complication and on quality of ANC follow up brought a remarkable change on the quality of referral system

When the quality of ANC service improved problems were identified early and proper pre-referral management will be given in turn avoid un-nesseserly referrals. In this QI the referral system was well assessed and show much progress which was evidenced by positive feedback from catchment hospitals.

Conclusion

We (the QI team) concluded that this QI on Anti-natal service can be expanded to other facilities with little modification. Such QI initiative increase the access of pregnant mother for essential care and services on ANC follow ups and improve early detection and management of complications in pregnancy.

Limitations

Limitation In this QI project we don't include and assess HBSaG test, TT vaccination, Anti D and partner HIV testing which was difficult to catch up at first visit

Reducing Length of Stays at Orthopedics Department, at Felege Hiwot Comprehensive Specialized Hospital, Bahirdar Ethiopia

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Affiliation: 1 Felege Hiwot Comprehensive Specialized Hospital

Abstract

Background: Average Length of stay (ALOS) is an important indicator of the efficiency of hospital management. We identified unnecessarily long hospital stays at the orthopedics department of Felege Hiowt Hospital. Hospital occupancy is strongly associated with length of stay (LOS) of patients in a hospital. improvements in hospital efficiency requires reduction in unnecessary LOS of patients, risk of infection and medication side effects, improvement in the quality of treatment, and increased hospital profit with more efficient bed management. We initiated a quality-improvement project aimed to decrease average length of stay from 11 days to 9 days.

Methods: The Model for Improvement was utilized. A root-cause analysis using fishbone diagram used to identify root cause problems (figure 1). Three areas of opportunities were identified and simulated five interventions. Interventions included Implement SAFER patient flow bundle, regular monthly meeting/ discussion with staffs, purchasing high energy backup generator. Utilized Plan-Do-Study-Act (PDSA) methodologies to test solutions & gathered data on process and outcomes daily/ weekly basis for 4-Months.

Result: The average length of stay (AVLoS) at the orthopedics department decreased from 11 days to 10 days over the course of the 4 month period (figure 2). The last four data points showed that average length of hospital stay was below median AVLoS of 2011E.C.

Lesson learnt & Conclusions: The application of improvement approach made a significant contribution for continuously improving efficiency and quality of care through demonstrable results. The implementation of SAFER strategy decreased the average length of hospital stay in orthopedics department. For all inpatient care units, implementing SAFER method is efficient method to decrease AVLoS, which helps the client by reducing medical cost.

KEYWORDS: Orthopedics, Quality, Improvement, Hospital, Average, Length of Stay (LOS), Efficient

Introduction

The average length of stay (ALoS) is an index which refers to the average number of days that admitted patients spend in the hospital. The health status of developing countries of the world including in Ethiopia is far from acceptable (1). The Average Length of stay (ALOS) is an important indicator of the efficiency of hospital management (2). A decline in hospital efficiency has been observed worldwide due to inappropriate hospital admissions or length of stay which affects the health care costs as well as the efficiency of healthcare providers and quality of provided care. Hospital occupancy is strongly associated with length of stay (LOS) of patients in a hospital. improvements in hospital efficiency requires reduction in unnecessary LOS of patients and results in decreased risk of infection and medication side effects, improvement in the quality of treatment, and increased hospital profit with more efficient bed management(2,3). Improvements require care coordination across the entire health care system, the active management of an orthopedic surgery service found to have an effect on LOS, hospital efficiency and quality of provided care (4).

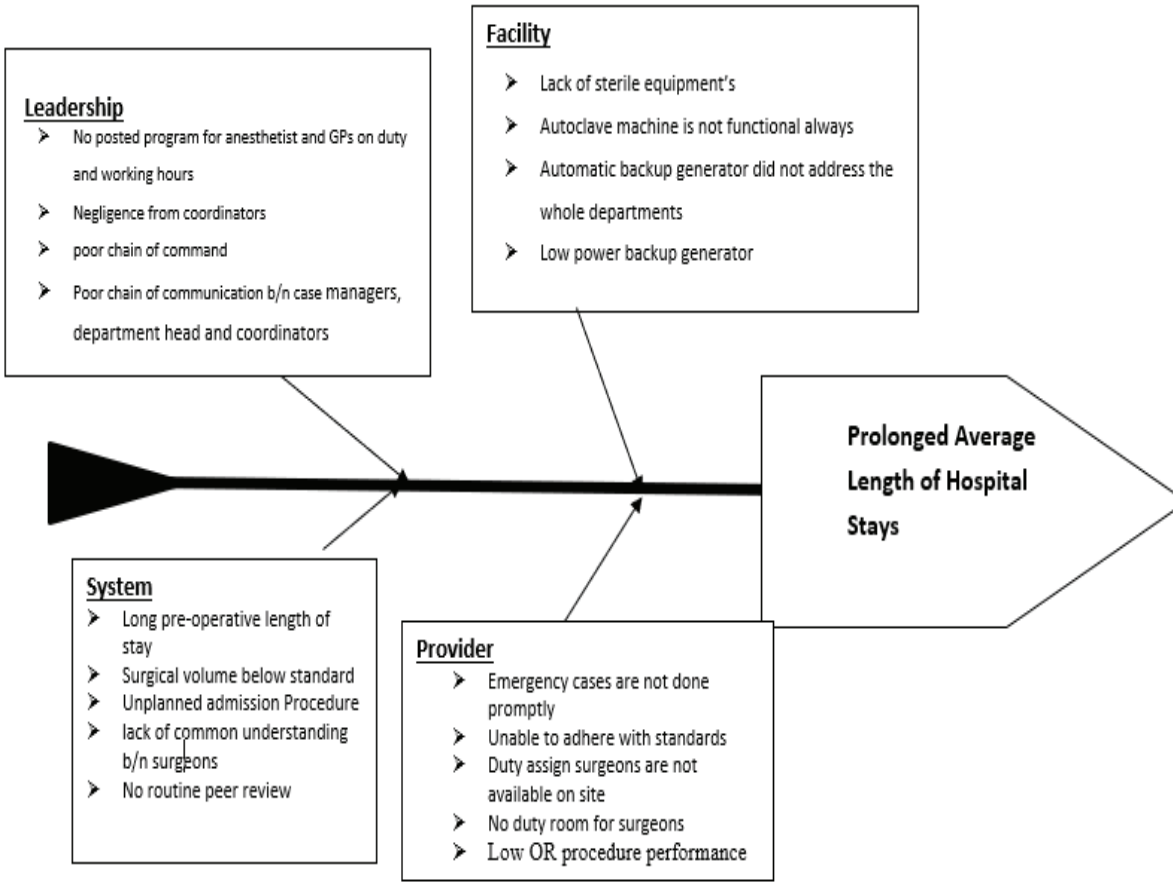
Problem:

The orthopedics department at Felege Hiwot comprehensive and specialized hospital in Bahir Dar. The orthopedics department is equipped 44 ward beds, 05 recovery beds and 03 Operation beds currently providing 5-8 major procedures per a day. In 2011 E.C, the department observed unnecessary high average length of stay (ALOS) for inpatients is 11 days. The unnecessary length of hospitalization days in the hospital at the orthopedics department was, during this period, twice higher than the national standard benchmark (<5days) which resulted to high surgical backlog and characterized as poor Key Performance Indicators (KPI). Therefore, we initiated a quality-improvement (QI) program by our Quality Improvement (QI) team to address the quality issues related high average length of hospital stay by improving the hospital efficiency. The team aimed to decrease average length of stay from 11 days to 9 days starting from November 01 to February 30/2012 E.C in FHCSH, orthopedics department.

Description of Performance Gaps:

After realizing that we had a significant problem with ALOS, a thorough analysis was undertaken by our QI team. The team revealed several root cause problems subsequent to performing a root-cause analysis using fishbone diagram as described below.

Figure 1. Root causes Analysis, Fishbone



Methods:

A model for improvement method was used for this project to reduce ALOS. Subsequently, Plan-Do-Study-Act (PDSA) is used to test change ideas.

Improvement interventions included five Change Ideas; 1) Implement SAFER patient flow bundle, 2) Regular monthly meeting/ discussion of case managers, coordinator and department case on KPI/AVLoS, 3) Prepare duty room for surgeons, 4) Purchasing high energy backup generator, 5) Address the problem for all partners, were chosen by the team for implementation.

The team used OPD EDD/end date of discharge/ AND CCD/clinical care date/ registration, operation order/schedule for Elective Patients in orthopedics ward and weekly orthopedic ward SAFER review registration form each of which contain a series of data entry fields, which facilitated the QI initiative. The team monitored process and outcome measures daily and weekly using prepared checklist. A run chart tracked the effect of interventions on median time to goal enteral feeds and followed established run chart rules for special cause for analysis.

Measures

Outcome measure:

- Average length of hospital stay/ALoS

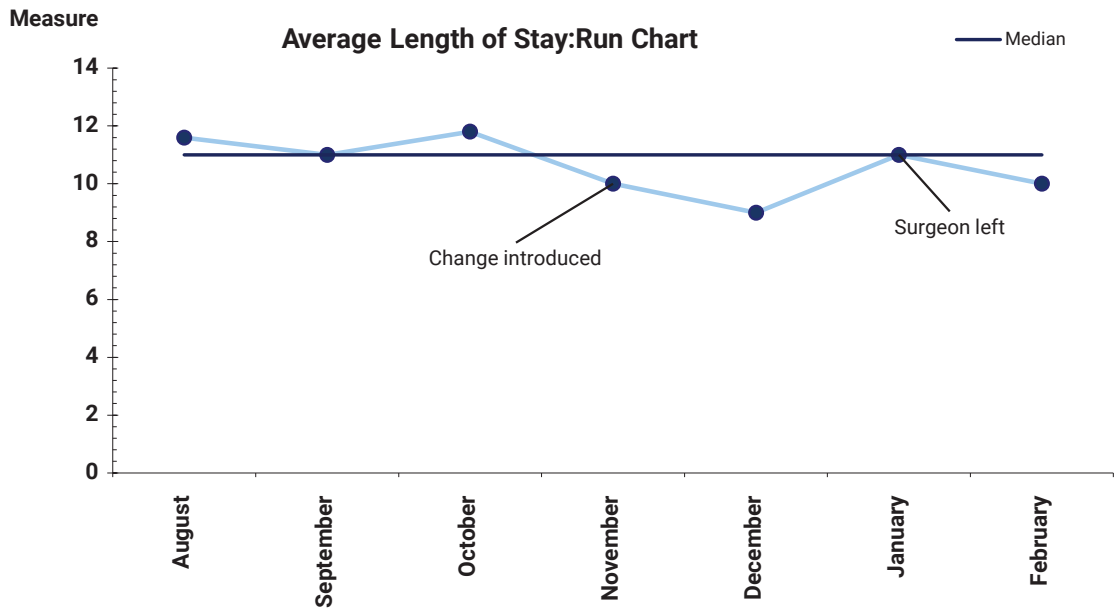
Process measures:

- Proportions of patients leave the bed before midday
- Proportion of cards having EDD and CCD
- Proportion of cards having assessment at a time

Results:

The average length of stay (AVLoS) at the orthopedics department decreased from 11 days to 10 days over the course of the 4 month period (figure 2). The last four data points showed that average length of hospital stay was below median AVLoS of 2011E.C.

Fig. 2: Average length of hospital stay in Felege Hiwot comprehensive specialized hospital, orthopedics department, Bahir Dar, Ethiopia, March 20202.



Lesson learnt & Conclusions

The application of improvement approach made a significant contribution for continuously improving efficiency and quality of care through demonstrable results. The implementation of SAFER strategy decreased the average length of hospital stay in orthopedics department. For all inpatient care units, implementing SAFER method is efficient method to decrease AVLoS, which helps the client by reducing medical cost.

Discussion and orientation with relevant stakeholders, early morning were relevant for making good decisions and for early patient care. Well planned date of procedure and discharge helped the patient by reliving the patient anxiety and shorten waiting time in hospital.

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Reduce Surgical Site Infection (SSI) Among the Mothers Delivered by C-section at Ghandi Memorial Hospital, Addis Ababa

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Affiliation: 1. Ghandi Memorial Hospital

Abstract

Background: Cesarean section rates have been increasing dramatically during the past three decades and surgical site infections are becoming a leading cause of morbidity and mortality among women undergoing cesarean deliveries. However, there is lack of sound evidence on both the magnitude of the problem and the associated factors in developing countries including Ethiopia. Our baseline assessment showed that the SSI among mothers delivered by C-section was 4.7% which was high. The purpose of improvement project is to assess the root causes of surgical site infection in mothers delivered by C-section, design interventions under our control, test them and study the impacts for potential implementation.

Methods: Quality improvement team witnessed a frequent incident of SSI among mothers delivered by C-section and collected baseline performance. These data were collected by assigned facility QI head from Delivery and admission registers. Monthly readmission among mothers who delivered by C/S due to SSI were used to assess the impacts of our interventions. For all readmitted mothers due to SSI, the cards were sorted from the card room to assess the total OR duration time, what preoperative medication was given and who done the procedure. During the project lifetime and follow-up period the rate of surgical site infection among women undergoing cesarean delivery in Ghandi Hospital was monitored.

Interventions: The following interventions were generated by QI team and tested. These includes, provide refresh orientation on hand washing, OR law including (minimizing OR traffic flow and place proper demarcation of OR), availing sterile (clean) OR cloths for each professional, prepare and introduce standardized pre-op patient protocol, and periodic bacteriological (culture) test for OR sets.

Results: Following introduction of designed interventions the SSI rate among mothers delivered by C-section has decreased by 50%. Post intervention eight months' time follow-up data shows from the total delivery of 7,749 about 2767 delivered by CS (35.7%) which reveals increment.

Conclusions: This iterative improvement learning revealed that health facilities can bring improvement in client/patient outcome and experiences. The results support the idea that improving infection prevention and control practice in the OR and availing and applying pre-operative protocol appeared to be useful in decreasing SSI.

Background

Surgical site infection (SSI) is an infection occurring within 30 days after the operation and involves the skin and subcutaneous tissue and/or the deep soft tissue of the incision. SSI is a leading cause of morbidity and mortality among women undergoing cesarean section (CS) with reported rates of 3–15%. High rates of SSI following CS were reported in several lower- and middle-income countries: 16.2% in a study from Nigeria, 19% from Kenya, and 10.9% from Tanzania. A study done at Teaching Hospital in Rwanda revealed that 4.9% Ceserean deliveries were complicated by SSI.

In Ethiopian context, the prevalence of SSI at Hawassa Teaching and Referral Hospital, Assela Teaching and Referral Hospital and Lemlem karl General Hospital were 11%, 9.4% and 6.8% of respectively. Associated factors to SSI among mothers delivered by C-section includes pre-operative, intra operative and emergency conditions for developing SSI.

In Ethiopian context post-partum infection is the fourth leading cause of maternal mortality and morbidity from which SSI shares the largest proportion. Recognizing routine readmissions following C-section delivery quality improvement team have looked at the data and designed improvement project to both quantifying the problem, its root causes and identifying the interventions.

Problem Statement -The SSI readmission was found cost substantial and it lead to high morbidity and mortality of mothers delivered by CS in Gahndi hospital. Baseline before the QI project initiation showed that the readmission rate among CS deliveries was 4.7% between Meskrem and Hidar 20E.C. furthermore, our baseline data shows only 50% of the mothers were taken ceftriaxone as pre-operative prophylaxis.

Project Aim: Ghandi Memorial Hospital QI team aim to reduce rate of re-admission among mothers delivered by C-section from 4.7 % to 2.5% by the end of Hamle 2012 E.C.

Root Causes Analysis: QI used brainstorming, fishbone problem analysis and 5 WHY to understand the root causes of the problem and then design interventions. The following root causes were reached

Absence of standardized protocol of giving prophylactic antibiotics pre-operatively. Baseline showed only 45.2% took prophylactic antibiotics

80% of cesarean deliveries were done by junior residents the complications occurred in R1&R2 residents

Changes Made: The following interventions under hospital's horizon of control were generated.

Provide refresh training about hand washing, OR law including on traffic flow management, and place proper demarcation of OR

Availing sterile (clean) OR cloths for each professional

Preparing standardize pre-op patient -protocol

Periodic bacteriological (culture) test for OR sets

Methods

After detailed description of how to test change ideas, interventions were introduced during Tahisas 2012 E.C. Monthly readmission of mothers who delivered by C/S due to SSI was used to measure the effectiveness of those interventions. The data were collected by assigned facility QI head from delivery and admission registers. For all readmitted mothers due to SSI, the cards were sorted from the card room to assess the total OR duration time, what preoperative medication was given and who done the procedure. The team ploted run chart to analyses the effectiveness of the intervention and student T test was used to treat the association between who done the procedure and type of preoperative prophylactic medication. Total number of delivery and CS delivery were obtained from facility DHIS report. Annotated run chart both for outcome and process indicators. Resources used for testing the changes and implementation only from Hospital.

Measurements

Outcome Measure

- Re-admission rate among mothers delivered by C-section
- Numerator: Number of mothers re-admitted to hospital after C-section delivery monthly
- Denominator: Total deliveries by C-section monthly

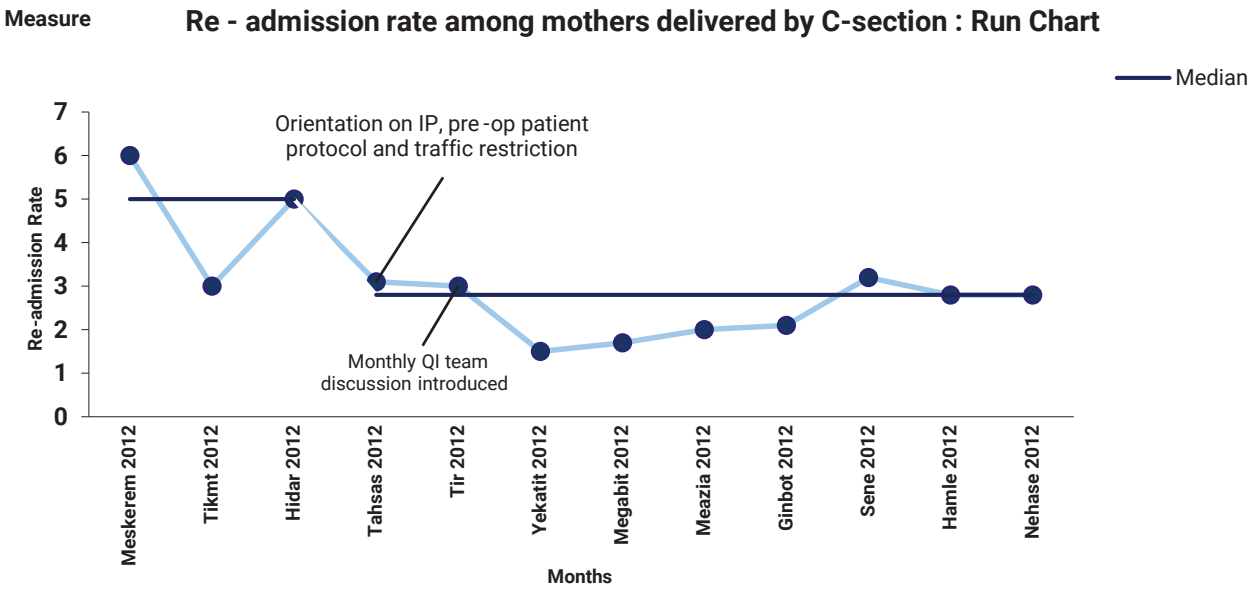
Process Measures:

- % labor, delivery and OR staff took orientation on hand hygiene (IP)
- % labor, delivery and OR staff took orientation on traffic flow restriction
- % labor, delivery and OR staff took orientation on pre-op patient protocol.

Results

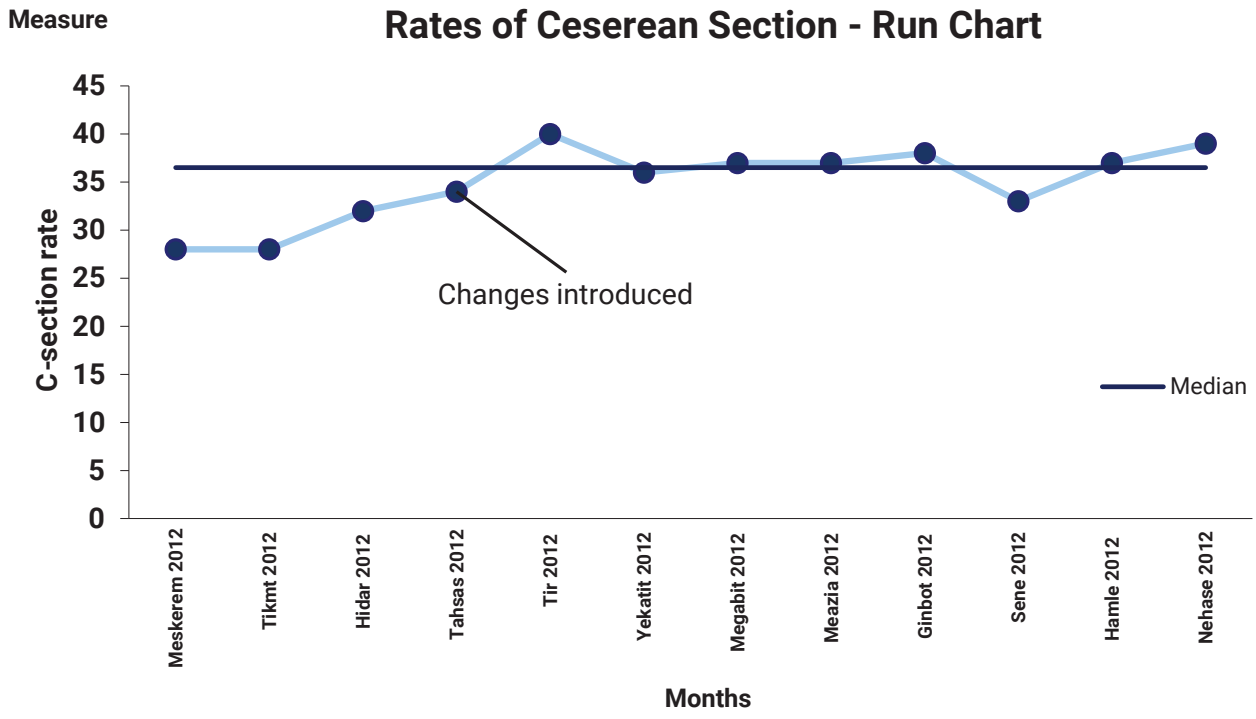
Post intervention eight months' time progress data shows that from the total delivery of 7,749 about 2767 delivered by CS (35.7%). During project time a total of 2767 mothers were delivered by C-section, compared to baseline time data the rate of c-section has increased. However, the rate of re-admission from SSI has reduced from 4.7% to 2.8. Only 65 out of 2767 were readmitted with diagnosis of SSI which is 2.8%. As we see on baseline only 50% of the mothers were taken ceftriaxone as pre-operative prophylaxis whereas post operatively about 89 % of mothers were taken ceftriaxone.

Figure1. Run chart show the trend of re-admission due to SSI, Ghandi Memorial hospital



There was significant association of utilizing ceftriaxone and less occurrence of SSI (corrected X2 =22.7382, two tailed p value>0.01). There is no significant difference on the duration time taken at OR.

Figure 2. Run chart to showing the rate of C-section delivery during the project period



Discussion

The implementation of infection prevention activity in the OR set up did significantly reduced the Measurement in the reinfection rate due to SSI. The development of preoperative protocol and increased utilization of ceftriaxone as pre-operative medication in the post intervention period had positive outcome on reducing SSI. This project was no negative impact on decreasing total ae well as CS delivery in the facility rather it was increased

Limitations

The team did not analyze the reason for an increased trend in C/S delivery after project implementation. In this project others potential effects (cofounding variables) for wound reinfection like underlining medical illness, age, number of previous scar and increasing trend in CS was not addressed.

Conclusion

The result support the idea that improving IP practice in the OR and avail pre-operative protocol appeared to be useful in decreasing SSI. However, the reason for the trend of increased CS rate should be investigated. Since this method was not costly and we recommend other facilities to test it by using measurements and either statically prove or disprove it so that it will be disseminated /presented in the learning session of different workshops

Reducing Lost Drop Out ART Clients at ART Clinic, Finote Selam Hospital, Amhara Region, Ethiopia

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Abstract

Introduction: According to WHO 2019 report globally, there were approximately 37.9 million Human Immunodeficiency Virus (HIV) infected people and around 770,000 people died from AIDS-related illnesses worldwide in 2018. In this year, there were 20.6 million people with HIV in eastern and southern Africa, and 5.0 million in western and central Africa. In Ethiopia, 718,498 people were living with HIV and 426,472 start ART (EFY, 2009). 16,000 Ethiopians are infected by the deadly virus annually, while 16,000 death every year in 2018 (UNAIDS, 2019).

Currently there are 1882 clients on ART service. One of the challenges seen in ART service is increased number of lost/drop clients from the program. Lost is one of the problems to achieve 2nd 90 of 2020 national target of HIV transmission.

Methodology: We conducted problem analysis to identify the root causes for ART client dropout using Driver Diagram through brainstorming. After priority were set for generated change ideas, we used testing framework to learn the impacts of our changes made. Following the problem analysis, we designed the following change ideas to solve the problems: Regular and timely tracing of patients, Regular health education, counseling and adherence support, Communicate with religious leaders, Availing OI drugs, Timely requesting of medications with RRF, IFRR , Continuous psychosocial support for eligible clients, Assigning focal person for ART client charts ,separating ART client charts shelf in the card room, Adherence counseling, Regular lab follow up of-CD4 and viral load, Conducting regular monthly meeting of- PMT, Smart care utilization/quality of data/ and Availing materials-balancing scale. Furthermore, improvement measures were also set with clear operational definition

Results: During the project time we were able to trace 138 patients, provided a health education to 1800 client; provided adherence counseling services for 1670 client, performed regular viral load monitoring for 1907 client. ART client dropout has decrease 164 to 26, traced 138 client and achieve 100% from the target.

Conclusion: After the intervention of the improvement interventions, the lost/drop ART client has significantly decreased.

Background

Finote Selam Hospital is a primary hospital found in Amhara regional state, West Gojjam zone. It located 387 Km from Addis Ababa serving 1.5 to 2.0 million population. Globally, there were approximately 37.9 million Human Immunodeficiency Virus (HIV) infected people and around 770,000 people died from AIDS-related illnesses worldwide in 2018. In this year, there were 20.6 million people with HIV in eastern and southern Africa, and 5.0 million in western and central Africa [1]. In Ethiopia, 690,000 people were living with HIV in 2018 [2]. Currently, there are 1907 clients on ART service in Our hospital. There are total 30 of 1-15 year there are 15 male and 15 female clients, 15 year and above 1877 clients of which 1112 female and 765 male are on service.

Statement of the problem

In Finote Selam hospital ART clinic, up until Sene, of 2012E.C, the clinic reports showed that, 164 clients lost from their follow up and are not return to care timely (103 up to 2011E.C and 61 in 2012 E.C). One of the challenges seen in ART service is increased number of lost/drop clients from the program. Lost is one of the problems to achieve 2nd 90 of 2020 national target of HIV transmission. Starting from 1998E.C, total number of drop cases increased from time to time despite tracing activities, adherence supports, health educations and different retention mechanisms. These 164 dropout cases are from 14 different woredas/ town within the catchment population.

Aim statement:

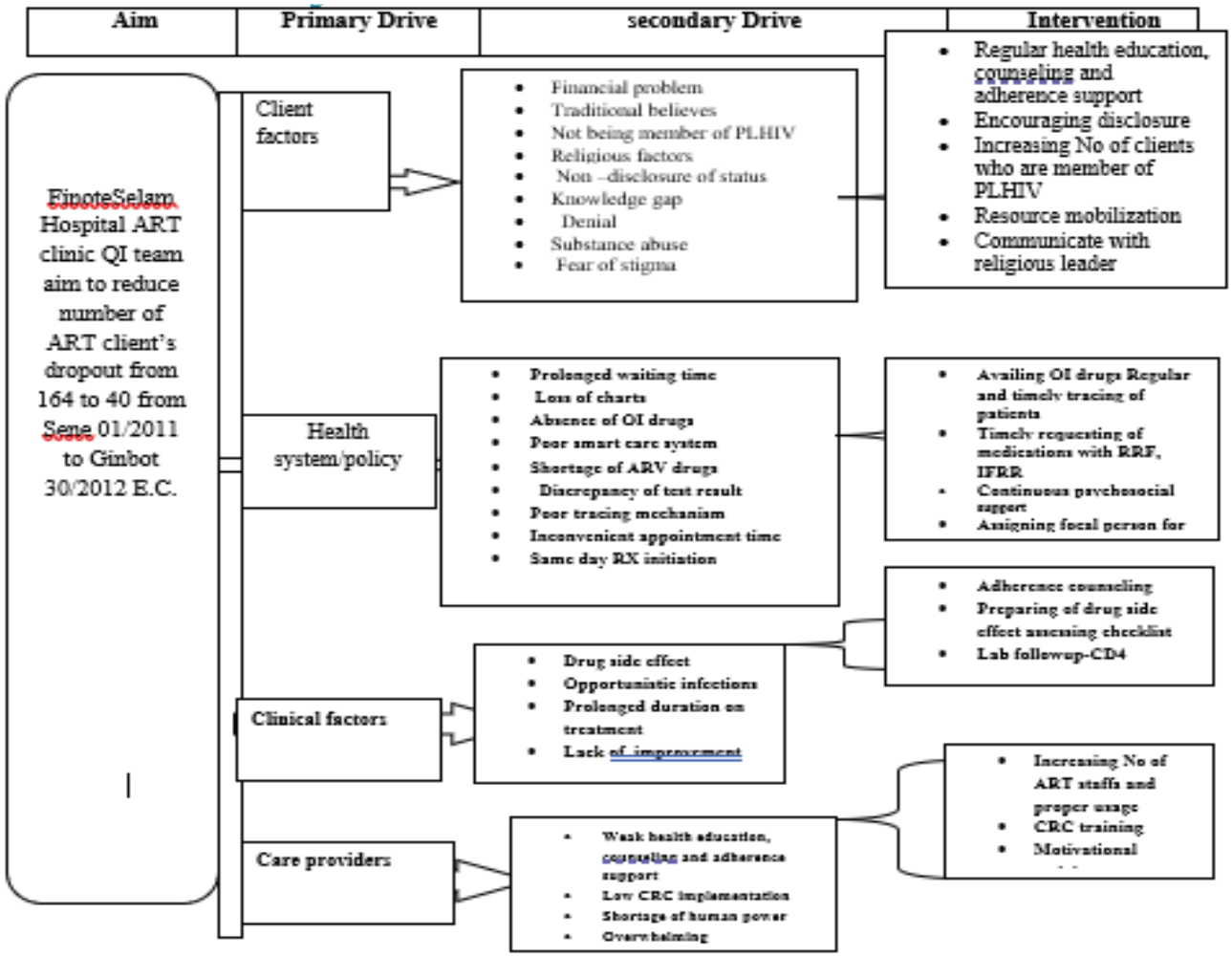
FinoteSelam Hospital ART clinic QI team aim to reduce number of ART client's dropout from 164 to 40 from Sene 01/2011 to Ginbot 30/2012 E.C.

Methodology: We conducted problem analysis to identify the root causes for drop ART client using Driver Diagram. The following were the major causes of drop of ART client; Poor tracing mechanism, Weak health education, counseling and adherence support, financial problem, Religious factors, Traditional believes, prolonged waiting time, Loss of charts, Substance abuse, Fear of stigma, Drug side effect, Opportunistic infections, prolonged duration on treatment, Low CRC implementation, Shortage of ARV drugs, Discrepancy of test result, Absence of OI drugs, and Poor smart care system.

Interventions: Following the problem analysis, we designed the following change ideas to solve the problems: Regular and timely tracing of patients, Regular health education, counseling and adherence support, Communicate with religious leaders, Availing OI drugs, Timely requesting of medications with RRF, IFRR , Continuous psychosocial support for eligible clients, Assigning focal person for ART client charts ,separating ART client charts shelf in the card room, Adherence counseling, Regular lab follow up of-CD4 and viral load, Conducting regular monthly meeting of- PMT, Smart care utilization/quality of data/ and Availing materials-balancing scale.

Then, we defined outcome, process, and balancing measures were set with clear operational definition. and we were regularly monitoring them. Our outcome indicator is number of ART client dropout per month; process indicators include: Number of clients who are traced back and put on treatment, Number of health education sessions conducted, Frequency of contact with religious leaders, Amount of OI drugs availed, Number of IFRR,RRF timely sent to PFSA, Presence of assigned focal person for ART client charts, Number of missed charts, Number of clients who are in adherence counseling, Number of clients who had regular viral load monitoring, Number of clients who had CD4 determination, Presence of monthly PMT meeting, Establishment of smart care, Presence of availed balancing scale and shelf, Presence of separated ART clients chart shelf in the card room

Figure 1. Driver Diagram



Changes Ideas Generated:

- Regular health education, counseling, and adherence support
- Encouraging disclosure
- Communicate with religious leaders
- Availing OI drugs
- Regular and timely tracing of patients
- Timely requesting of medications with RRF, IFRR
- Continuous psychosocial support for eligible clients
- Assigning focal person for ART client charts, separating ART client charts shelf in the card room
- Regular lab follow up of-CD4 and viral load
- CRC training and Motivational activity for ART staffs
- Conducting regular monthly meeting of-PMT
- Opening of additional ART follow up clinic
- Separating ART client charts shelf in the card room

NB. Change ideas were prioritized based on horizon of influences by QI team and the Hospital management.

Measurements:

Outcome indicator:

- Number of ART client dropped follow-up traced and put on treatment per month

Process indicators:

Number of health education sessions conducted

- Number of clients who are in adherence counseling services
- Number of clients in which disclosure is done
- Number of clients who become member of PLHIV association
- Amount of resource mobilized
- Frequency of contact with religious leaders
- Amount of OI drugs availed
- Presence of assigned focal person for ART client charts
- Number of clients who are in adherence counseling
- Number of clients who are followed with drug side effect checklist
- Number of clients who had regular viral load monitoring
- Number of clients who had CD4 determination
- Presence of monthly PMT meeting
- Presence of separated ART clients chart shelf in the card room

Results

During the project time we were able to trace 138 patients, provided a health education to 1800 client; provided adherence counseling services for 1670 client; involved religious leaders (two time; assigned one focal person for ART client charts and one porter; performed regular viral load monitoring for 1907 client; conducted regular monthly QI meetings, and established separated ART client chart corner in card room. As a result, over the last ten months, ART client dropout has decrease 164 to 26, traced 138 client and achieve 100% from the target. List of dropout ART clients were identified with their addresses; from the 164 dropped out clients, 158 charts were found while 06 of the charts were missing.

Process Indicators

Indicator	Target (by % or number)	Data component=N/D* 100	Frequency	Data source	Responsible body for data collection
Proportion of clients who are tried to trace back (reached)	164 clients	# of drop patients who are tried to reached/164*100 128/164*100=78%	Monthly	Drop register, report from mentor team	QIP data Focal
Proportion of clients who are traced back and put on treatment	164 clients	# of drop patients traced back and put on treatment/164*100 34/164*100=21% and or with STOs 25/164*100=15%	Monthly	Software & lost/drop register	QIP data Focal

Outcome Indicator

S/No	Indicator	Target (by % or number)	Data component=N/D*100	Frequency	Data source	Responsible body for data collection
	Number of ART clients drop	From 164 to 40	The remaining total drop is 26	Monthly	Drop register	QIP data Focal

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Improving Quality of Inpatient Medical Record Completeness at Najo General Hospital, Oromia region, Ethiopia

Abstract

Introduction: Medical record completeness is a key performance indicator that is related with delivery of healthcare services in the hospital. At hospital level, statistics collected from medical records are used to review the incidence and type of diseases treated and different procedures performed. Statistics derived from the daily bed census and medical records are also used to assess the utilization of services and enable the hospital to make appropriate financial and administrative plans and to conduct vital research.

Problem: Medical Record Completeness was 50.00% during baseline assessment at inpatient department of Najjoo General Hospital. The incompleteness of medical records compromises the quality care of patient's and results in different medical errors and patient dissatisfaction.

Objectives: The aim of project is to improve quality Medical Record Completeness from base line of 50.00 % to 90.00% from July-December 2019.

Methods: A hospital based Prospective and Retrospective cross-sectional study was conducted from July-December 31, 2019. Clinical Audit Committee, management members and Health professionals at inpatient ward were given orientation on Quality Improvement Project. Root Cause Analysis using Fish Bone Diagram was conducted and change ideas developed by using Driver Diagram implemented to improve the identified performance gaps.

Results: The mean rate of Medical Record Completeness at Inpatient Department was improved from 50.00% to 82.41% after different interventions were implemented.

Conclusion: The overall inpatient Medical Record Completeness in Najjoo General Hospital improved to 82.41%. The finding of this project suggests that a simple set of interventions such as availing inpatient medical record format and training healthcare providers improves the inpatient medical record completeness.

Keywords: MRC, Inpatient, Quality Improvement Project, Health Professionals

Introduction

Medical record completeness is a key performance indicator that is related with delivery of healthcare services in hospitals. Statistics collected from medical records are used to review the incidence and type of diseases treated and different procedures performed. Data from daily bed census and medical records are also used to assess the utilization of services and enable the hospital to make appropriate financial and administrative plans and to conduct vital research. Good medical records are essential not only for the present and future care of the patient but also as a legal document to protect the patient and the hospitals from litigation.

Poor quality of the information in patient medical records may be a cause or a consequence of poor quality of care and associated with higher rates of adverse events. Better quality of healthcare data in patient medical records can affect clinical and administrative decision making in health economics and patient safety. Adverse events occur in an estimate of 2.9 to 3.7 percent of acute care hospitalizations in the United States of America (USA) and it is estimated that between 44,000 and 98,000 patients die in hospitals each year as a result of medical error explained as the failure of planed action to be completed as intended. Despite the importance of medical records to high quality and efficient care management of patients, medical records, especially in developing countries like Ethiopia has not been a priority, generally inadequately supported and poorly managed.

Objective: The aim of this study was improving quality of Medical Record Completeness at Inpatient Department from 50.00% base line to 90.00 % from July-December 2019

Methods

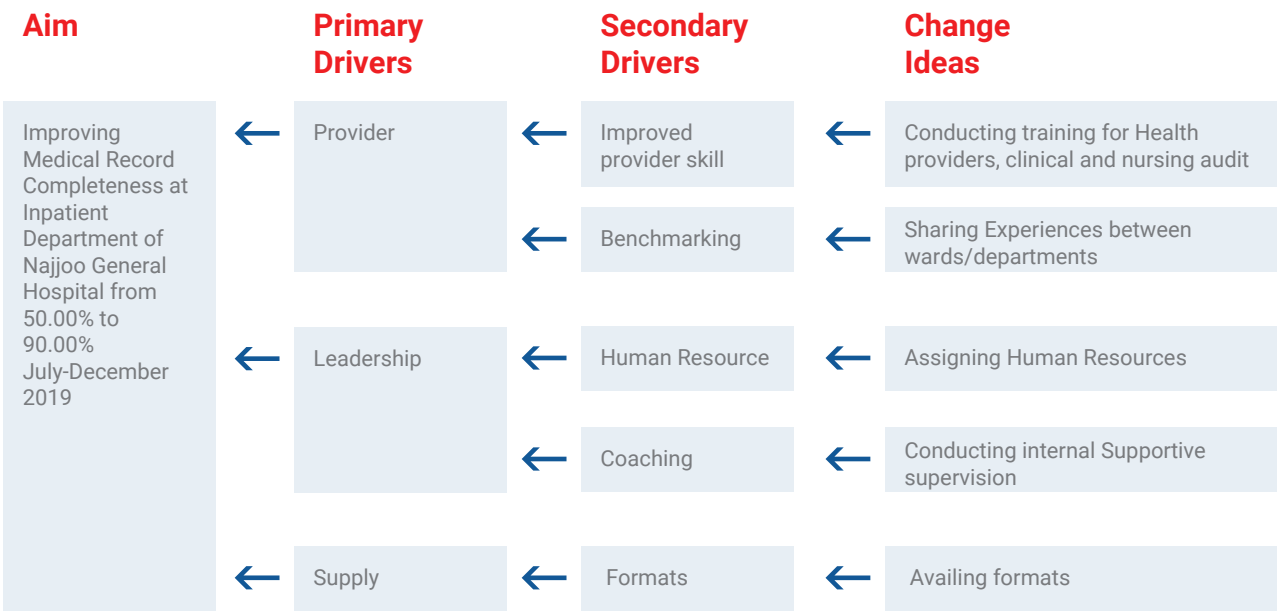
Najjoo General Hospital is located in Western Part of Oromiyaa Region, West Wallaggaa in Najjoo Town and 515Kms from AA. It provides service for 8 woredas and about 1.5 million Catchment Population. It is a lead hospital for 8 hospitals including Wallaggaa University Referral Hospital in the cluster. As a lead hospital, it provides Supportive Supervision and Mentorship for 7 Hospitals and 32 Health Centers.

A hospital based retrospective and prospective cross- sectional study design and a systematic random sampling technique were used to assess completeness of medical record on a total of 2891 patient cards from inpatient department before and after application of interventions for improvement.

At base line, the MRC in Najjoo General Hospital was 50.00%. To identify factors for the low completeness of medical records, root cause analysis using fish bone diagram was conducted. Accordingly the QI team in the hospital identified low knowledge and utilization of MRC formats (Vital sign, History Sheet, Progress Note, Medication Sheet, Nursing Standard, Discharge Summary), turnover of staffs during day and night shift, absence of formats, lack of training, lack of adherence to guidelines/ protocols, lack of good attitude, negligence from staffs, weak handover system, lack of communication, consultation gaps, non –functionality of Clinical/ Nursing Audit Committee, lack of monitoring and evaluation of program from department heads and physicians as contributing factors for low medical record completeness.

To address the identified problems that resulted in low completeness of medical records, the QI team used brain storming sessions and a driver's diagram and came up with change ideas/interventions (fig.1).

Figure 1: Driver diagram for improving Medical Record Completeness at Inpatient Department



Descriptive statistics were computed for analysis and data results shown by using tables, figures and charts.

Interventions

Onsite refreshment training was given for one day for all Health Professionals on Medical Record Completeness checklists and hospital reforms as well as quality improvement projects followed by weekly coaching. Weekly, monthly and Quarterly discussions were held with department heads on how to improve adherence to protocols/ guidelines. Clinical and nursing audits were conducted every month with hot discussion on findings and follow up actions. Daily monitoring of patient cards who undergo admission were conducted and higher professionals consulted timely.

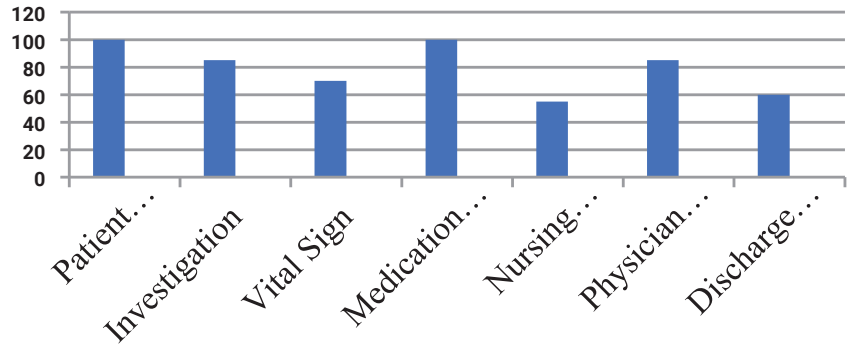
Results

Analysis was done using descriptive statistics and results depicted in narration, using tables and figures as below.

4.1 Medical Record Completeness at Inpatient Department

Formats/ check lists were used for evaluation of Medical Record Completeness from Inpatient Department. Findings on Inpatient Medical Record Completeness based on Criteria/ Checklist used was: Patient History Note (100%), Investigation (85%), Vital Sign (72%), Medication Administration (100%), Nursing Care Plan (55%), Physician Round (90%) and Discharge Summary (81%), respectively (fig. 2).

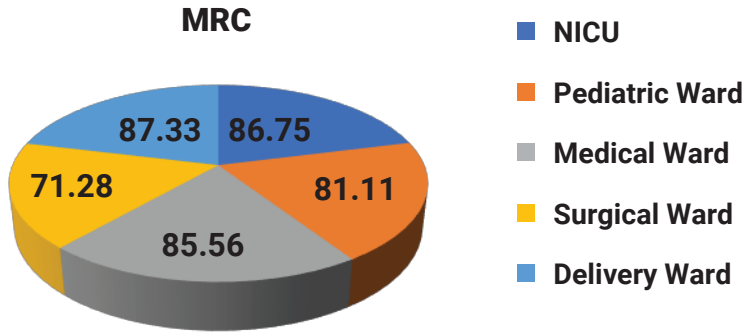
Figure 2. MRC at Inpatient Department



4.2 Medical Record Completeness by Wards

findings on MRC at inpatient Department disaggregated by wards was: NICU (86.75%), Pediatric Ward (81.11%), Medical Ward (85.56%), Surgical Ward (71.28%) and Delivery Ward 87.33%), respectively.

Figure 3. MRC at Inpatient Department by Wards.



4.3 Medical Record Completeness by Wards pre and post interventions

The MRC at different wards pre and post intervention was 50.62% to 82.41%, respectively.

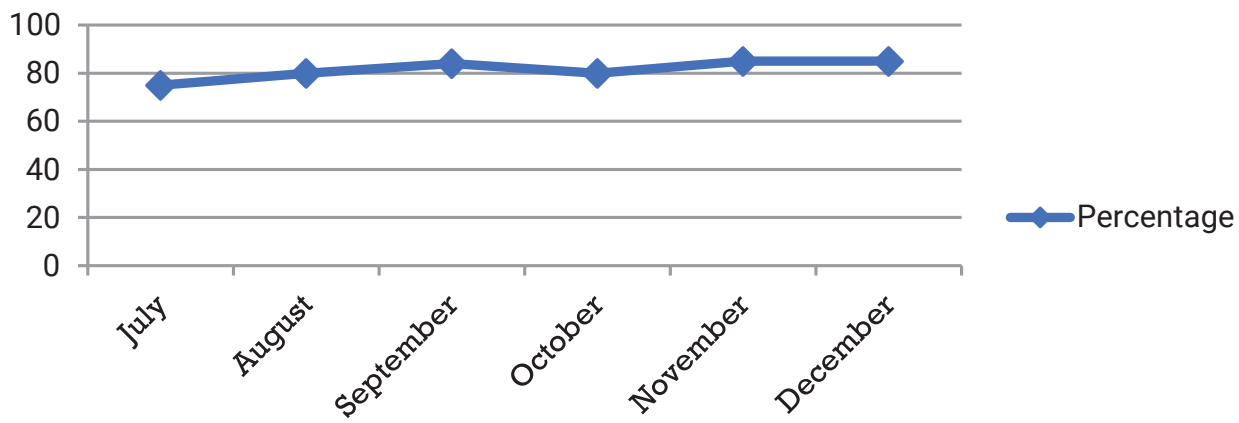
Table 1: MRC at Inpatient Department by Wards Pre and Post Intervention.

Intervention	NICU	Pediatric Ward	Medical Ward	Surgical Ward	Delivery Ward	Average
Pre-Intervention	60.21	47.10	45.79	45.00	55.00	50.62
Post Intervention	86.75	81.11	85.56	71.11	87.33	82.41

4.4 Medical Record Completeness by Months

The rate of MRC fluctuated from month to month and average rate of MRC of six months was 82.41%.

Figure 4. Trends of MRC by Months from July-December 2019.



4. Limitation and Lessons Learnt

Lack of knowledge, low adherence to checklists/ formats and reforms with poor hand over system from provider's side and interruption of supply of formats from organization side were major contributing factors for low medical record completeness. The role of hospital leadership is very critical in establishing and maintaining proper functioning of health care services and quality of care being provided. Convincing Health Professionals and advising them on the maintenance of medical record completeness both for professional and patient safety was key to success. This project did not measure the performance of each health provider for fulfilling medical record completeness.

5. Conclusion

The overall inpatient Medical Record Completeness in Najjoo General Hospital was 82.41% and the highest rate of completeness was seen in inpatient physician History note and Medication Administration which were 100.00%. The least completed was Nursing Care Plan (55.00%). The finding of this project suggests that a simple set of interventions such as availing inpatient medical record checklist/format and training healthcare provider improves the inpatient medical record completeness. This project indicates that applying strategic problem solving and Model for Improvement to medical record completeness can be effective in improving quality of healthcare.

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Medication Errors in Ethiopia: Systemic Review and Meta-Analysis

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Abstract

Background: The caution medication prescription and administration are the main physician and nursing services though there was no study to show medication error at the nation level in Ethiopia. Therefore, we estimated the national prevalence of medication errors.

Methods: A systematic review of studies searched in PubMed, Scopus, African Journal of Online, and Google Scholar was done. Newcastle-Ottawa quality assessment scale was used to assess the quality status of the included studies. We employed Galbraith plot and Egger's regression test to assess publication bias. The national prevalence of medication errors was estimated using a random-effects model meta-analysis. Moreover, subgroup analysis and meta-regression analyses were done to explore the reason of statistical heterogeneity.

Results: A total of 14 studies with 5,552 administered medications and 5,661 prescription sheets were included. The overall prevalence of medication error in Ethiopia was 57.6% (95% CI: 46.2, 69.0). The pooled burden of medication administration and prescription error was 58.4% (95% CI: 51.4, 65.5) and 55.8% (95% CI: 27.0, 84.6), respectively. Omission error (38%), wrong dose (38.5%), and the wrong combination of drugs (28.7%) were highly reported types of prescription errors, whereas missed doses (57.0%), technical errors (47.0%), wrong time (35.0%), and wrong dose (30.0%) were frequently observed medication administration errors.

Conclusions: Medication errors are very common in Ethiopian hospitals whereby at least one out of two medications were wrongly prescribed and administered. Our review provided a shred of up-to-date evidence for clinicians, regional and national healthcare policymakers to appraise and improve the quality of hospitals' inpatient care.

Keywords: Administration; Error; Medication; Prescription; Ethiopia

Background

To achieve the United Nations Sustainable Development Goals of prioritizing healthy lives and well-being for all (1), healthcare services are striving throughout the world to offer high quality care to their patients. Hence, with caution medication prescription and administration are the main responsibilities of physician and nurse in a clinical setting that helps for good prognosis of a diseased person (2). Any medication prescription and administration error will lead to undesirable outcomes, including adverse drug reactions, drug-drug interactions, lack of drug efficacy, suboptimal patient adherence, poor quality of life, and death (3). In 2016, medical errors are the third leading cause of death in hospitals (4), which may have significant health and economic consequences. Patient engagement, providing training and education for healthcare workers, evaluation of patients' medication, medication reconciliation, writing medication information on discharge notes, and application of electronic tools (automated information systems) (5-8) are relevant interventions to prevent medication errors.

Medication administration and prescription errors are becoming common problem in the healthcare system. Out of 700 prescriptions to medical Intensive care Unit patients in India, 17.8% and 22.4% prescriptions found to have medication administration and prescription errors, respectively (9). In Iran, a systematic review showed 31.8% overall medication error, 44.8% prescription error, and 38.8% administration error (10). Likewise, medication errors were reported with varieties of findings in Ethiopia. For instance, medication prescription error reported from the range of 32.3 % (11) to 95.2 % (12) and medication administration error in the range between 46.1% (13) and 89.9% (14).

Medication error could be associated with numerous factors, such as poor coordination of care, cost-related barriers, multi-morbidity, increasing days of hospitalization, childhood and older age, lack of training, inadequate knowledge, inadequate perception of risks, overworked healthcare professionals, distractions, lack of standardized protocols, and insufficient resources. Medication packaging problem, poor nurse-physician communication, and problem in recruiting competent professional were also the suggested reasons (15).

In Ethiopia, there is no nationwide study that determines the national burden of medication administration and prescription errors. Thus, we aimed to estimate the national burden of medication administration and prescription errors in Ethiopia.

Methods

Protocol and Reporting

The protocol is registered in the Prospero database with a registration number of CRD42019138125. The reports of this systematic review and meta-analysis are reported with the standard flow of Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) guidelines (16).

Literature Search

The literature search was done using PubMed, Scopus, African Journal of Online databases, and Google Scholar databases. Additional unpublished research works were retrieved from Addis Ababa University, Ethiopia online research repository. We further reviewed the reference lists of all included studies.

The search terms or phrases were medication error, prescribing error, dispensing error, administration error, documentation error, preparation error, medication mistake, drug error, drug administration error, drug mistake, prescribing mistake, administration mistake, preparation mistake, wrong medication, wrong drug, wrong dose, wrong route of administration, wrong calculation, and Ethiopia. Search strings were established by using "AND" and/ "OR" Boolean operators. For instance search string for Scopus was: (medication AND administration AND error[mesh AND terms]) OR (drug AND administration AND error) OR (medication AND prescribing AND errors) OR (drug AND prescribing AND errors) OR (drug AND preparation AND errors) OR (medication AND mistake) OR (drug AND mistake) OR (prescribing AND mistake) OR (administration AND mistake) OR (preparation AND mistake) OR (documentation AND error) OR (wrong AND drug) OR (wrong AND route AND of AND administration) OR (wrong AND medication) OR (wrong AND dose) OR (wrong AND calculation) AND (Ethiopia) AND (LIMIT-TO (AFFILCOUNTRY , "Ethiopia")) AND (LIMIT-TO (SUBJAREA , "MEDI") OR LIMIT-TO (SUBJAREA , "PHAR") OR LIMIT-TO (SUBJAREA , "IMMU")) AND (LIMIT-TO (LANGUAGE , "English")).

Inclusion and exclusion criteria

Studies were included if they have reported proportion of either overall medication error, administration error, or prescription error in Ethiopia and published in English.

Qualitative studies and studies without full-text were excluded.

Measurement of variables

Medication administration error: Occurrence of at least one of the following errors (12-14, 17-21).

Omission error: Failure to administer an ordered dose to a patient (14, 17, 18, 22)

Wrong time: Administration of medication without adhering a predefined time interval from its scheduled administration time (if there is greater than 30 minute or 1-hour difference between the ordered time and the time of medication is administered) (14, 17, 19, 20, 22)

Wrong dosage-form: Administration of a drug product to the patient in a different dosage form than ordered by the prescriber (14, 22)

Deteriorated drug error: Administration of a drug that has expired or for which the physical or chemical dosage-form integrity has been compromised (22)

Wrong dose: Administration a dose that is greater than or less than the amount ordered by the prescriber (17-20, 22)

Non-adherence: Inappropriate patient behavior regarding adherence to a prescribed medication regimen (22)

Wrong route: Includes order written for the wrong route and medication administered to a patient using a different route than ordered (17-20, 22)

Unauthorized drug error: When the prescriber did not authorize the administered medication (14, 17, 18)

Wrong patient: When a medication of one patient is wrongly given to another patient (17, 19, 20)

Documentation error: Medication that is administered to the patient but not documented in the medication administration record sheet or incorrectly documented (18, 19)

Wrong administration technique: Exclusion, or incorrect performance of a procedure ordered by a prescriber immediately before administration of each dose of medication (14)

Wrong drug preparation: A drug product which formulated incorrectly or manipulated before administration (19)

Wrong drug: Medications administered to the patient that was not on the patient's medication chart (19, 20)

Prescription error: the deviation of medication prescription from the standard practices. It includes the following errors (11, 23-25).

Wrong combination: Drug interactions and therapeutic duplications (23, 24)

Omission error: Medications ordered without specifying dose or type of dosage form or frequency or route (23-25)

Wrong frequency: Drugs prescribed with a frequency greater or less than what is recommended (23, 25)

Wrong dose: If the ordered dose is higher or lower than what is recommended (23, 25)

Wrong route: Medication was prescribed to be given in a route other than the recommended route (23, 25)

Wrong indication: The presence of inappropriate indications and contradictions which were not noted by the prescribing physician (23-25)

Quality assessment

The quality of included articles was evaluated by using the Newcastle-Ottawa quality assessment scale for a cross-sectional study. Two independent reviewers assessed the quality of included studies. Discrepancies between the two reviewers resolved through discussion with the interference of the third reviewer.

Data extraction

Microsoft Excel 2010 worksheet (Microsoft Corporation, Redmond, WA, USA) was used for data extraction. The first author, year of publication, study patient unit or ward, study design, sample size (number of prescription and/or administration), data collection method, response rate, source of fund, and proportion with 95% confidence interval were extracted. The authors estimated proportion from available information using the recommended statistical formula.

Data analysis

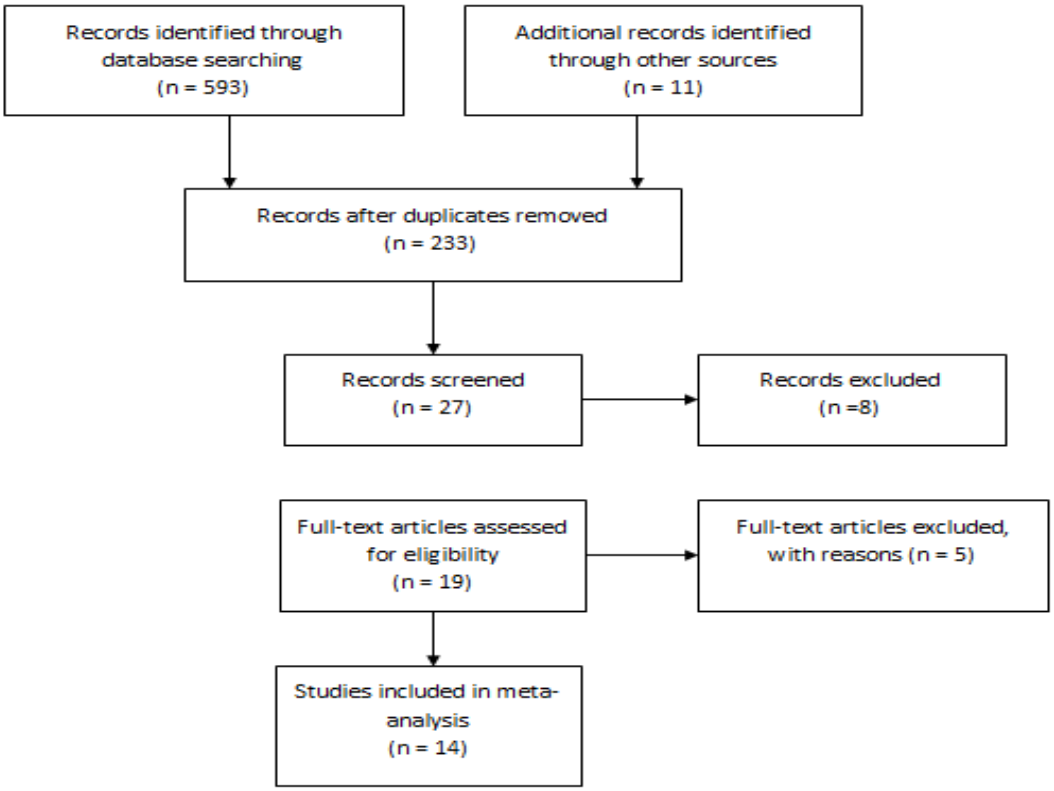
Using Microsoft Excel, authors calculated the logarithm of proportion and standard error from the extracted observed data. Then, the stored data from Microsoft Excel 2010 worksheet imported to STATA 14 statistical software for Windows for further analysis. Galbraith plot and Egger's regression test were used to assess the presence of publication bias (26, 27). I-square statistics was used to assess heterogeneity of studies. The pooled national medication error was estimated using a random-effects meta-analysis model (28). Subgroup-analysis based on the types of medication error (administration versus prescribing error) was done. We also applied meta-regression analysis to see the effect of sample size and year of publication on statistical heterogeneity (29).

Results

Search findings

Based on our search, 93 studies were accessed in PubMed, 130 in Scopus, 317 in African Journals Online, 53 in Google Scholar, and 11 in Addis Ababa University Ethiopia's online research databases. After rigorous screening and selection, 14 studies were included in the meta-analysis (Figure 1).

Figure 1: PRISMA diagram of article searching process



Characteristics of studies

All the included studies were cross-sectionally conducted and reported prescribing errors (n=4) (11, 23-25), both prescribing and administration errors (n=1) (30), and the medication administration errors (n=9) (12-14, 17-22). Medication administration errors were collected through a prospective approach using the observational checklist, whereas prescribing errors were collected through reviewing patents medical charts and prescription sheets. A total of 5,552 medications were found to be administered and 5,661 prescribed sheets were included. Details on the study characteristics are presented in Table 1. We found that none of the studies were below the acceptable quality status.

Table 1: Studies characteristics

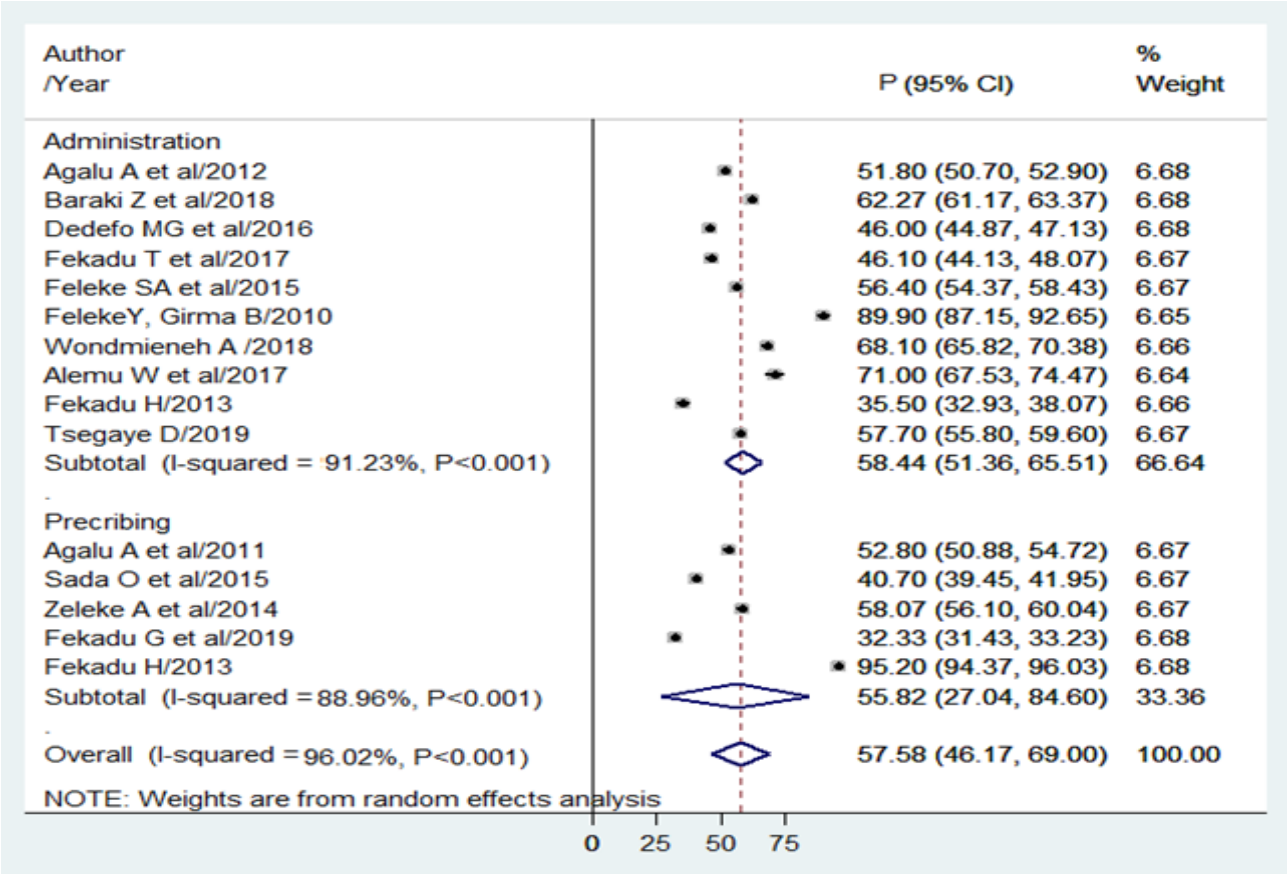
First Author	Study setting (Health institution)	Ward/ Population	Error type	Prescription / administration frequency	Response rate with percentage	Source of fund
Agalu A et al/2012 (21)	Jimma university specialized hospital	ICU	Administration	1,200	100	Jimma University
Agalu A et al/2011 (23)	Jimma university specialized hospital	ICU	Prescribing	398	100	Not reported
Baraki Z et al/2018 (17)	Public Hospitals inTigray	Pediatrics patient	Administration	1,251	100	Aksum University
Dedefo MG et al/2016 (22)	Nekemte Hospital	Pediatrics patient	Administration	1,115	100	Jimma University
Fekadu G et al/2019 (11)	Nekemte Hospital	Pediatrics patient	Prescribing	1,596	100	None
Fekadu T et al/2017 (13)	Ayder Hopital	all patient	Administration	366	100	None
Sada et al/2015 (24)	Tikur Anbesa Hospital	Medical ICU	Prescribing	882	100	Addis Ababa University
Feleke SA et al/2015 (18)	Felege-Hiwot Referral Hospital	Inpatient department	Administration	360	100	University of Gondar
Zeleke A et al/2014 (25)	Dessie Referral Hospital	pediatrics ward	Prescribing	384	100	Jimma University
FelekeY, Girma B/2010(14)	Jimma University Specialized Hospital	Pediatrics inpatient	Administration	218	100	
Wondimieneh A/2018(19)	Addis Ababa Tertiary care hospitals	Medical, surgical and emergency department	Administration	298	98.3	Not reported
Alemu W et al/2017 (20)	Two public hospitals in southern Ethiopia	All patients	Administration	130	92.2	Jimma University
Fekadu H/2013 (30)	Tikur Anbesa & ZewudituMemorial Hospital	Pediatrics ward	Prescribing	2,401	95.2	Addis Ababa University
Fekadu H/2013 (30)	Tikur Anbesa & Zewudito Memorial Hospital	Pediatrics ward	Administration	200	100	Addis Ababa University
Tsegaye D/2019 (12)	Public Hospitals in Amhara	All wards	Administration	414	98.1	Amhara Health office

Meta-analysis

Medication errors

The overall medication error in Ethiopia was found to be 57.6% (95% CI: 46.2, 69.0). The magnitude of medication administration and prescription error was 58.4% (95% CI: 51.4, 65.5) and 55.8% (95% CI: 27.0, 84.6), respectively (Figure 2).

Figure 2: Forest plot presentation of a medication error, medication administration and prescribing error



Types of prescription errors

Different types of prescription errors were estimated using the overall prescribing error as a baseline. Illegible handwriting (99.4%) is the commonest problem of prescription error though it was reported only by one study. Omission error (38%), wrong dose (38.5%), the wrong combination of drugs (28.7%) were also frequently reported types of prescription errors (Table 2).

Table 2: Types of drug prescription errors with their reported proportion (p)

Types of drug prescribing errors	P (95% CI)
Omission (11, 24, 25)	37.986 (15.195, 60.776)
Wrong dose (11, 23-25, 30)	38.482 (15.213, 61.750)
Wrong dosage-form (25)	7.170 (5.346, 8.994)
Wrong frequency (23-25, 30)	8.042 (4.957, 11.127)
Inappropriate indication (13, 23-25)	6.380 (1.982, 10.777)
Wrong combination of drugs (23, 24, 30)	28.707 (24.856, 32.559)
Wrong duration (23)	3.400 (1.909, 4.891)
Wrong abbreviation (23, 24)	7.821 (3.027, 18.669)
Wrong route of administration (23)	1.900 (0.817, 2.983)
Drugs with incorrect instruction (11)	6.200 (5.045 ,7.355)
Illegible handwriting (30)	99.400 (98.820, 99.98)

Types of administration errors

Of the reported administration errors, 57.0% were missed doses, 47.0% were technical error, 35.0% were wrong time, and 30.0% were wrong dose (Table 3).

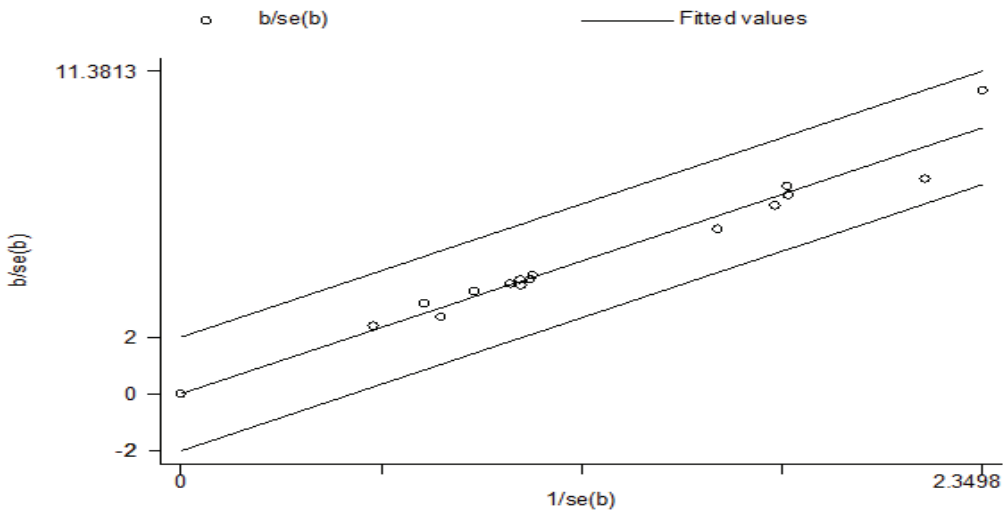
Table 3: Types of drug administration errors with their reported proportion (p)

Types of drug administration errors	P (95% CI)
Wrong time (14, 17-22, 30)	34.992 (21.491, 48.493)
Omission of drugs (14, 17, 18, 21, 22, 30)	15.021 (5.827, 24.216)
Missed doses (13, 21)	57.036 (18.912, 132.985)
Wrong route (18-22)	17.030 (8.084, 25.975)
Wrong dose (13, 14, 17-22, 30)	30.007 (8.970, 51.044)
Unauthorized drug (14, 21)	2.787 (2.097, 3.477)
Wrong rate of infusion (21)	1.400 (0.945, 1.855)
Wrong dose and rate (21)	3.900 (2.989, 4.811)
Wrong drug (19, 20, 22)	27.334 (11.961, 42.707)
Wrong patient (19, 20)	26.890 (8.840, 62.620)
Wrong dosing schedule (22)	1.800 (1.139, 2.461)
Deteriorated drug (22)	14.600 (13.202, 15.998)
Wrong dosage form (22)	1.200 (0.831, 1.569)
Non-adherence (22)	4.500 (3.447, 5.553)
Monitoring error (22)	8.400 (7.151, 9.649)
Technique error (14, 18)	46.995 (4.160, 98.150)
Unauthorized error (18)	1.100 (0.671, 1.529)

Publication bias and meta-regression

All the reported proportions from primary studies are plotted within the estimated confidence interval as shown in the Galbraith plot below (Figure 3). We also carried out Eggers' regression test and declared that there was no publication bias (p-value=0.998). The meta-regression analysis showed that neither sample size nor year of studies significantly contributed to between study heterogeneity.

Figure 3: Galbraith plot with inverse standard error (1/se (b)) and standardized effect size (b/se (b))



Discussion

To achieve the WHO five years strategy to reduce medication-related errors by 50% throughout the world (31), subsequent (inter) national data generation is important. Hence, we assessed the national burden of medication errors in Ethiopia.

The overall medication error in Ethiopian hospitals was 57.6%. From medication administration and prescription perspectives, the estimated error was 58.4% and 55.8%, respectively. This finding was higher than a national survey study in Nigeria (47%) (32). This discrepancy might be due to medication errors were recorded based on professionals report in case of a study in Nigeria, but data were collected through observation and assessing the prescribed sheets in all included studies of the current meta-analysis. Likewise, the result of this meta-analysis was higher than the report in Iranian hospitals (31.8%) (10) and United states or United Kingdom (2-14%) (33), which relatively well-established and equipped health systems are available in developed countries. They also implement a web-based error reporting surveillance system (34). Strengthening the error reporting system is important to encourages safe medication administration and prescription practices, and improve the quality of clinical care services (35). In Ethiopia, however, error reporting trend needs improvement given that only 57.4% medication administration errors were reported (36).

Furthermore, in Ethiopia, one study showed that only 30.4% of medical doctors adhered to the code of ethics (37) though 75.7% of medical doctors have good knowledge about code of ethics (38). Non-adherence to professional ethics might lead to medication errors that cause harm to the patient, person who made the error, and/or healthcare system at large (39). In addition, health professions who make errors may feel a variety of adverse emotions after medical errors. It is thought that the pervasive culture of perfectionism and individual blame in health disciplines plays a considerable role in these negative feelings (40). This may further provoke them to make subsequent medication errors.

Healthcare providers should the standard guideline to minimize harms caused by errors (41). However, the high proportions of medication prescription and administration errors in Ethiopian hospitals are most likely committed by physicians and nurses, respectively. In this meta-analysis, we showed that, illegible handwriting (99.4%), error of omission (38%), wrong dose (38.5%), and wrong combination of drugs (28.7%) were common prescription errors made by physicians. In addition, missed doses (57.0%), technical error (47%), wrong time (35.0%), and wrong dose (30.0%) were frequent medication administration errors most likely made by nurses. These might also be due to high work load, distraction, absence of medication preparation room, unavailability of medication administration guideline, lack of job site training, and inappropriate health worker to patient ratio (17, 18, 20).

Lack of motivation of health workers, unfavorable working environment, working at various health facilities simultaneously, low public awareness about medication errors, lack of integration of medico-legal issues course in to the country education system, weak system in reporting unethical conducts, absence of standardized monitoring tool, and weak collaboration among key stakeholders might have their own contribution to the high proportion of medication error in Ethiopia. Furthermore, WHO recommended measures (42), like establishing well-standardized infrastructure (electronic networks, IT-based reporting and communication systems for prospective use (computerized physician prescription systems), barcode medication administration, and medical-chart oriented error registration are still a big problem in Ethiopia. Nurse-physician communication is low as a single study showed in Ethiopia (43).

Quality improvement and patient safety intervention strategies for the prevention and management of medication errors are necessary for Ethiopia (44). For instance, strong medico-legal rules, inter-and intra-professional communication, job aids system based reminders, computerization and automation, shift-to-shift handoffs (45), and wristband bar-code medication scanning could decrease medication errors (46), which are less likely to be implemented in Ethiopia. Therefore, the public health authority shall appoint qualified and capable inspectors to implement the provisions of laws and directives related to public health issues.

Limitations

No differences based on study country, study design, and no study with poor quality. Besides we did subgroup analysis for further potential sources of variation. However, I-squared showed the presence of statistical heterogeneity across studies though possible sources of heterogeneity resolved in the meta-analysis.

Conclusions

Medication errors are highly common in Ethiopian hospitals. In both medication administration and prescription errors, committed errors are very sensitive to further deteriorate and complicate the health of the patients. This finding has a policy implication to review the workforce of healthcare teams.

Conflict of interest

The authors declare no conflicts of interest.

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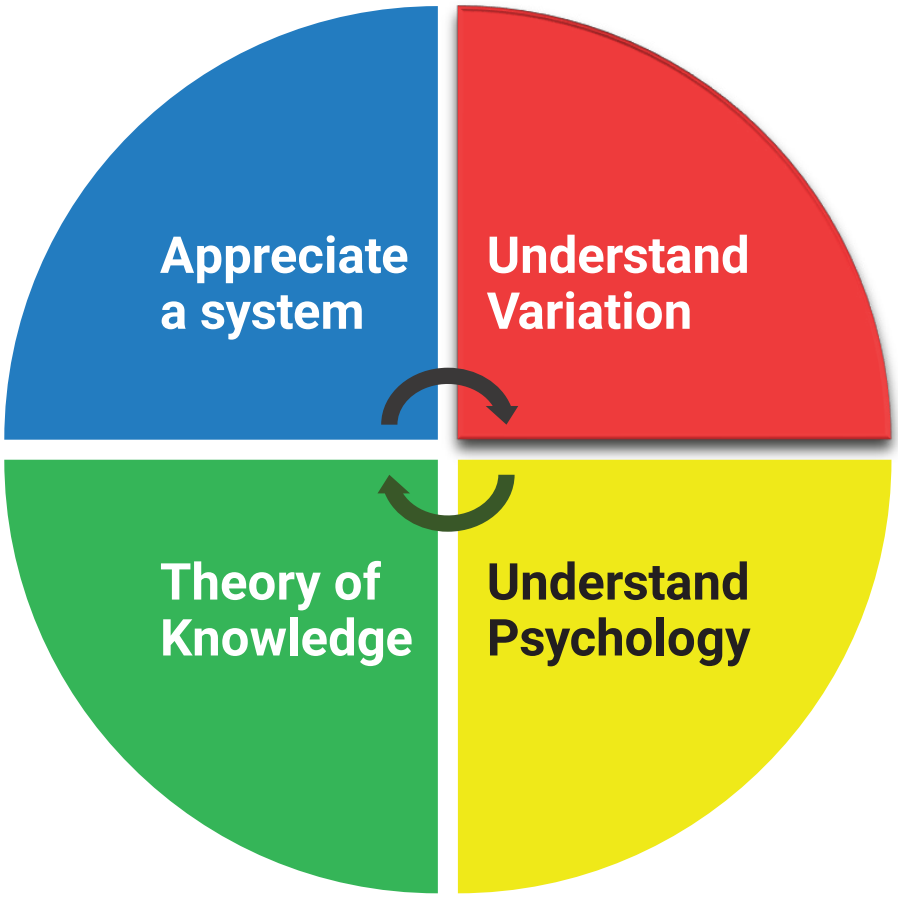
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