



A Quality Improvement Initiative on sustaining Kangaroo Mother Care Practices During COVID Pandemic

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Abstract

Introduction: COVID-19 pandemic has affected the KMC practices in our SNCU. Lack of clear guidelines and training about continuing KMC in COVID-19 times has further lead to decrease in KMC practices.

Methods: This is a prospective single centered quality improvement study conducted in the inborn unit of a tertiary care hospital. Intervention phase was done in August and September 2020. Preterm mother-infant dyads who were admitted in the inborn Level 2 Neonatal care unit with birth weight less than 2000 grams were enrolled in this study. A QI team comprising of resident doctors, nurses and supporting staff and a lactation counsellor was formed. The potential barriers for prolonged KMC were evaluated using fish bone analysis. A variety of measures were introduced and subsequently tested by seven plan-do-study-act (PDSA) cycles. Data on percentage of initiation of KMC was measured by bedside nurses on daily basis and the data was plotted on run chart every week during implementation phase.

Results: 116 eligible mother-infant dyads were studied during implementation period (50 days). We achieved our goal by step-wise implementation of changes through multiple PDSA cycles. The percentage of initiation of KMC among eligible preterm infants has increased from baseline of 43.4% to 83.3% and duration of KMC from 1.5 mean hours to 4.5 hours over a period of eight weeks.

Conclusions: Ongoing quality improvement measures increased the percentage of initiation and duration of KMC among eligible preterm infants without addition of extra man power

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Introduction

More than 80% of the world's 205 million annual neonatal deaths occur in babies with a low birth weight (LBW < 2500 gm) among which two-thirds are preterm (< 37 weeks gestational age) and one third are small for gestational age.¹ Kangaroo mother care (KMC) is part of evidence-based care for these newborns, and involves early, prolonged skin-to-skin contact and promotion of exclusive breastmilk feeding, resulting in early discharge with supportive follow-up.² Estimates suggest that achieving 95% coverage of special and intensive care for small and sick newborns could save nearly 750,000 neonatal lives by 2030 in 81 high-burden countries.³ The latest Cochrane review reported that neonates who received KMC had a 40% reduction in mortality, a 72% reduction in hypothermia and a 65% reduction in severe infections compared to standard care.⁴

The COVID-19 pandemic is having substantial effects on the coverage and quality of healthcare for mothers and newborns, particularly in low- and middle-income countries (LMIC). Estimates suggest that a 45% reduction in coverage of essential interventions and decreased access to food over six months could result in 56,700 additional maternal deaths and 1,157,000 additional under-5 deaths.⁵ A study in Nepal during the COVID-19 lockdown reported a 52% reduction in institutional births, a 20% increase in preterm birth rates, and a three-fold increase in the facility neonatal mortality rate.⁶ A rise in preterm birth rates would have a negative impact on newborns, families and health systems worldwide, especially in LMICs. Small babies, particularly those who are preterm, are especially vulnerable to reductions in health coverage and quality. Suman Rao et al, Study showed that KMC was being disrupted for the COVID positive mother and her newborn, and even for COVID negative mother-baby dyads.

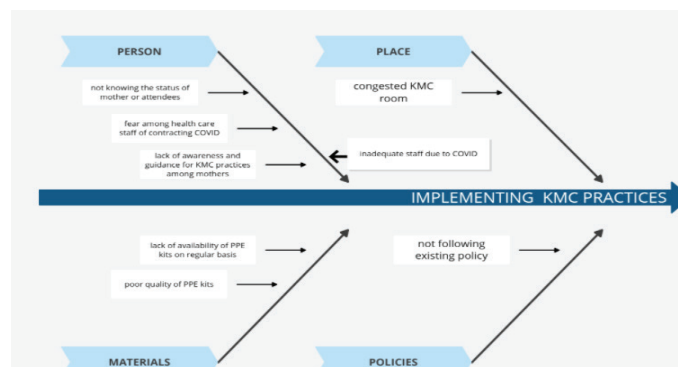
In our unit, a quality improvement (QI) programme on KMC has been going on since January 2019. With multiple plan-do-study-act (PDSA) cycles, we have achieved 94.8% rate of initiation of KMC during initiation phase and 84.2% during maintenance phase and mean duration of KMC of 8.5 hours. But the rate initiation of KMC among eligible preterm babies dropped to 43.4% at the beginning of COVID lockdown. To address this, we used QI approach to target the bottle neck areas in a step-wise manner.

Methods

Our study is a prospective single centered quality improvement study. We formulated an aim statement to increase the rate of initiation of KMC in stable LBW babies (< 2500 gm) admitted in our special SNCU from existing 43.4% to 80% over the period of eight weeks from month of August to September 2020. Primary outcome is percentage of initiation of KMC among eligible mother infant dyads. Each eligible mother-infant dyad was a single participant in the present study. All eligible preterm neonate admitted in level 2 NICU were included. Sick neonates [defined as those requiring invasive or non-invasive mechanical ventilation (NIMV) or shock [defined as the presence of tachycardia (heart rate more than 180 beats / minute, extremities cold to touch, and capillary fill time more than 3 seconds, with or without pallor, lethargy or unconsciousness)] or neonates receiving phototherapy were excluded.

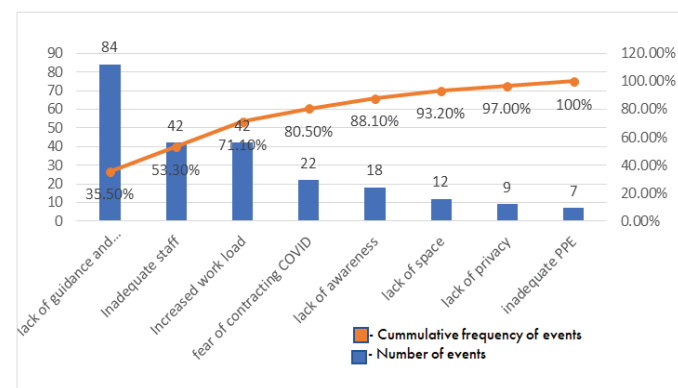
A QI team was formed comprising a team leader who is the Incharge Sister of level 2 NICU, one doctor and one nurse and one supporting staff in each shift, and one Lactation Counsellor. In baseline phase, data was collected in a pre designed proforma for 10 days for 15 eligible preterm infant-mother dyads. The barriers for initiation of KMC were analyzed by using a fish bone analysis.

FISHBONE ANALYSIS (Image 1)



By using pareto principle and pareto chart (chart 1) we found that 80% of the lack of initiation of KMC was due to fear among the health care staff of contracting COVID from the mothers/ attendees, health care staff working with half of the capacity and lack of guidance and assistance to the mother for KMC practice.

PARETO CHART (Chart 1)



A comprehensive KMC improvement package was planned. The following change ideas were proposed after discussions by the QI team and the ideas were tested by PDSA cycles. These are a) emphasising on the benefits of KMC as a part of preterm care to all the QI team members b) decongesting the KMC room c) ensuring regular supply of Providing Personal protective equipment (PPE kit) to the health care staff d) identifying a KMC LEADER among the mothers who then encourages other mothers for providing KMC to their infants e) display of posters, videos and photographs of the entire procedure and the beneficial effects of KMC in local languages and f) group counselling of mothers eligible for KMC by the doctors everyday

PDSA cycles were conducted for each change idea:

- 1st PDSA- creating a whatsapp group for the team members including doctors, nursing staff and lactation counsellors to

emphasise on KMC and group counselling the mothers by doctors everyday

- 2nd PDSA- Decongesting KMC room and spacing the beds as per social distancing norms
- 3rd PDSA— Training the supporting staff on KMC technique so that they help mothers in providing KMC
- 4th PDSA – Removing the apprehension among nursing staff of contracting COVID by providing protective gear to the nursing staff and surgical masks to all the mothers and attenders in KMC room
- 5th PDSA – Identifying an enthusiastic mother and making her a KMC leader who motivates others mothers to provide KMC to their infants and monitor them
- 6th PDSA – Motivating the lactation counsellors to rejoin the team and providing them protective gear to provide lactation support and KMC to all the eligible mothers
- 7th PDSA – KMC leader switches on the television which displays a video on technique and benefits of KMC in the local language twice a day
- 8th PDSA – Conducting Zoom meetings involving the team members every month to monitor the progress and address any concerns

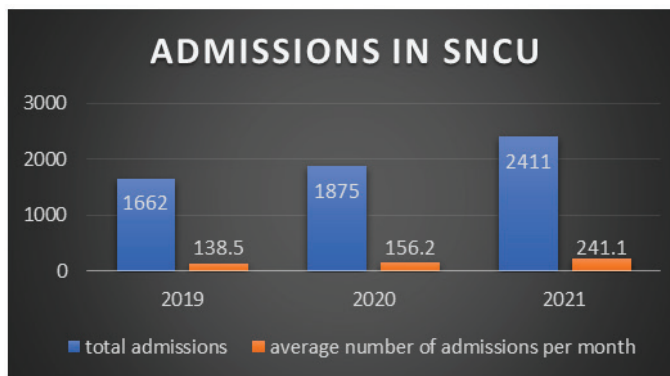
Results

The primary outcome measures were the initiation of KMC among eligible mother infant dyads and mean duration of KMC. This was evaluated by staff nurse or a lactation consultant on duty and documents in the KMC register. The data is assessed by the doctor incharge every week. The results were then plotted on a run-chart. The outcome was evaluated weekly in the implementation phase and monthly in the maintenance phase. A total of 116 mother infant dyads are included in the study over a period of eight weeks demographic profile of the babies included in the study are – (Table 1)

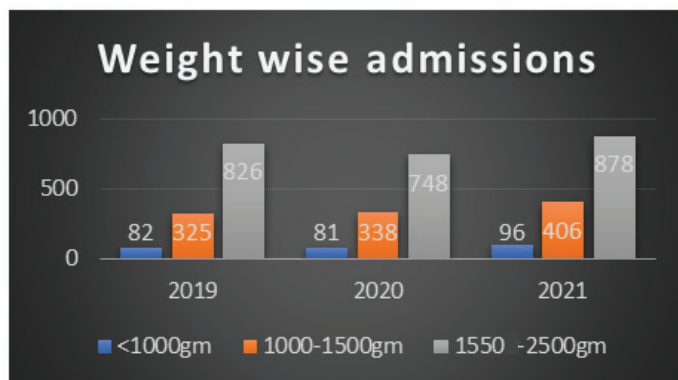
Parameter	Implementation phase (n = 116)
Birth weight	1200 gms (636.3)
Gestational age	32 weeks (4.9)
Male	62
Female	54

Data expressed as mean (SD)

During the COVID period, being a tertiary care centre which is the main referral centre in our state the number of admissions into our SNCU have increased by 12.8% in 2020 and by 45% in 2021 when compared to admissions in 2019 before COVID. (Chart 2)



The number of premature and Low birth weight infants have also increase during COVID period (Chart 3)



As a part of PDSA cycle 1 a WhatsApp group has been created to motivate team to focus on KMC among eligible mother infant dyads and encouraged doctors to provide group counselling to mothers on benefits and technique of KMC. This cycle was done for one week and rate of initiation has increased from 43.4% to 47.8%.

In PDSA cycle 2, we have decongested the KMC room. We initially had stable growing preterm infants and also term infants requiring only phototherapy in the KMC room. To maintain social distancing we have opened a new room for phototherapy thereby decongesting the KMC room (Image 2). We have arranged the beds and KMC chairs as per the social distancing norms. We have ensured that security personnel does rounds in each shift in KMC room to limit the number of attenders in the room.



In PDSA 3, we have provided surgical masks to all the mothers and attenders in the KMC room and protective gear to all the cadres of health care staff hereby relieving the apprehension among them of contracting COVID. Nursing staff then involved in supporting the mothers to provide KMC. (Image 3) After this cycle the rate of initiation has increased to 66%.

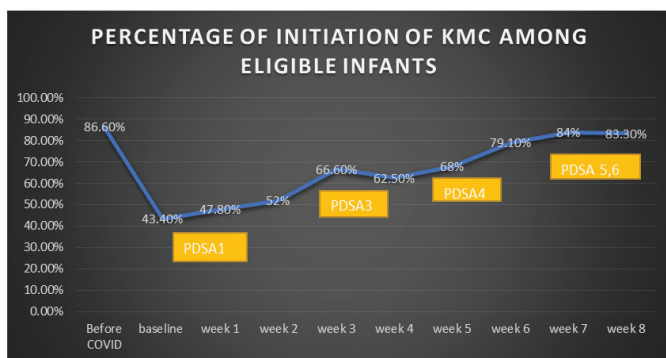


In PDSA 4, we have identified an enthusiastic mother and made her the KMC leader among all the mothers. She motivated other mothers to do KMC and also monitored them. The rate of initiation has increased to 79.1%

In PDSA 5, we have motivated our lactation counsellors to rejoin our team as they were very apprehensive about contracting COVID. After our lactation counsellor started helping mothers on lactation issues and also on providing KMC, the rate of initiation has increased to 84%.

In PDSA 6, we have also asked the KMC leader to switch on the television displaying the videos on KMC in local language. We have plotted the data on a time series chart every week during the intervention phase and every month during the maintenance phase. (Chart 4, 5, 6)

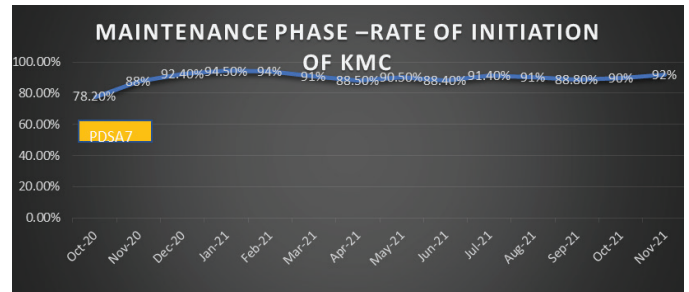
Chart 4



In the maintenance phase after four weeks at the end of October 2020, the rate has dropped down to 78.2%. Then we conducted the 7th PDSA cycle where we have started conducting Zoom meetings involving the team members every month to monitor the process and address any concerns. During maintenance (Sustenance) phase the data collected by the incharge nurse is plotted on a time series chart every month and was projected to all the team members during monthly Zoom meetings. During the maintenance phase the rate of initiation of KMC among stable

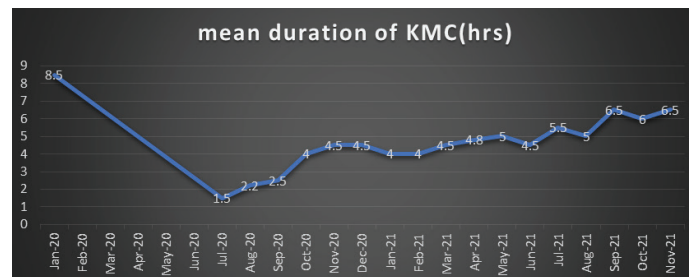
preterm infants was well maintained consistently above 85% with a maximum percentage of 94.5% as depicted in the Chart 5.

Chart 5



Duration of KMC has increased from mean of 1.5 hrs before intervention phase to 4.5 hrs at the end of intervention phase to 6.5 hrs at the end of maintenance phase (November 2021) as shown in the Chart 6.

Chart 6



All the process indicators and outcome indicators that were monitored during the study period are as shown in Table 2.

Process Indicators	Outcome Indicators
KAP of health care staff on KMC practices	Percentage of initiation of KMC among eligible infants
Number of days in a week the KMC room is arranged as per social distancing norms	Mean duration of KMC
Number of days in a week with adequate supply of N95 masks and PPE kits	
Compliance of health care staff to N95 masks	
Identification of KMC leader	
Compliance of Lactation counselors	
Number of virtual meetings conducted	

The following table (Table 3) shows the intervention and the change measured after the intervention.

	A	B	C	D
Baseline		15	43.4%	1.5
Intervention 1	Improving KAP among health care workers and mothers	18	47.8%	2
Intervention 2	Decongesting KMC room	20	52%	2
Intervention 3	Ensuring regular supply and compliance to N95 masks and PPE kits	16	66.6%	2.5
Intervention 4	KMC leader	22	79.1%	2.5
Intervention 5	Involving Lactation counsellors	17	83.3%	2.5
Intervention 6	Virtual meetings	23	88%	4.5

Note: A = Intervention, B = Number of Infants, C = Percentage of initiation of KMC, D = Mean duration of KMC (hrs)

In a Quality improvement study consistent adherence to the change ideas implemented by PDSA cycles is important to sustain the change. We noted the percentage of adherence to the process indicators by the end of maintenance phase and it is tabulated as follows in Table 4.

Process Indicator	Intervention Phase	Sustenance Phase
KAP of health care staff on KMC practices	96%	98%
Number of days in a week the KMC room is arranged as per social distancing norms	88%	92%
Number of days in a week with adequate supply of N95 masks, surgical masks and PPE kits	98%	100%
Compliance of health care staff to N95 masks	100%	100%
Identification of KMC leader	92%	86%
Compliance of Lactation counsellors	91%	100%
Virtual meetings conducted		98%

Discussion

KMC is a simple method of care for LBW infants that include comprises of early and prolonged skin-to-skin contact and exclusive and frequent breastfeeding.⁷ Early-onset KMC was associated with a statistically significant reduction in length of hospital stay.⁸

Practising KMC is a difficult task. Furthermore, practice of KMC is bound to be affected during COVID-19 era when situations require to maintain social distancing and less physical contact in our day to day lives.

Attitude of KMC providers has taken a downhill as they are now worried about viral transmission from the KMC provider and requirement of social distancing which has resulted in less interaction amongst them. Concern about harming the baby by transmitting virus has decreased motivation of KMC providers. Resourcing and sociocultural factors emerged as the top barriers to KMC adoption for nurses in the meta-analysis by Seidman et al.⁹

COVID-19 related measures can be considered as major barrier to the implementation of KMC practice. Possible explanations include fear amongst mothers regarding the spread of infection to the baby with skin-to-skin contact, fear and hesitation among healthcare providers to continue KMC in times of uncertainties like these when they have to maintain social distancing with the providers of KMC for the fear of possible transmission of SARS-CoV2, lockdown restrictions implemented by the authorities to prevent the community spread of the virus. There is also fear amongst the providers of KMC about contracting the virus while in the hospital and visiting too frequently or staying in postnatal maternal ward for providing KMC which was the standard practice before COVID-19 era. We tried to address the issues by doing a Quality improvement strategy, where with limited resources and not adding extra burden to the already over burdened staff we managed to improve our rates of initiation of KMC in our unit.

In our study we aimed to improve the rate of initiation of KMC from existing baseline of 43.4% to 80% over a period of eight weeks and to improve duration of KMC from existing 1.5 hours mean duration to 4 hours to be the end of intervention phase

Intervention phase included 116 mother infant dyads with a mean gestational age of 32 weeks (SD - 4.9) and mean birth weight of 1200 grams (SD - 636.3). The rate of initiation of KMC among eligible LBW infants increased from baseline of 43.4% to 83.3% at the end of intervention phase and was maintained at 92% at the end of maintenance phase. The duration of KMC has increased from mean of 1.5 hours to 4.2 hours at the end of maintenance phase and maintained at 6.5 hours at the end of maintenance phase.

A QI study by Ramachandrappa G, et al¹⁰ has shown improvement in duration of KMC from baseline of 2.7 hours / day to 7.8 hours / day. The study group had advocated foster KMC which was not possible in our unit at the time of COVID pandemic which could have been the reason for lower duration of KMC in our study. Another QI study by Meena Joshi et al¹¹ had shown improvement in KMC duration from 3 hours a day to 9 hours a day in post implementation phase by implementing foster KMC, access to more breast pumps round the clock which was not possible in our unit.

Active involvement of family members not only scales- up facility based KMC, but it is also known to sustain home-based KMC after discharge.¹² In our study we have involved mothers and made them KMC leaders to set an example for her peers and also to build confidence in them. Due to restricted entry of attenders during COVID pandemic we could not involve other family members to provide KMC for their infants.

Although increasing staff support and implementing temporary project staff is known to scale up KMC practices, the effect seems transient and fades with withdrawal of support.¹² A unique effort in our study was the utilization of existing resources and infrastructure (as in re arrangement of KMC room, involving existing Lactation counsellors) for strengthening KMC.

Audit-and-feedback is considered as one of the backbones of quality improvement initiative for changing health worker behaviour as well as an ongoing policy which formed an important milestone in our study. We conducted weekly audit in our study during intervention phase and monthly audits by Zoom meetings during maintenance phase to evaluate the potential reasons for sub optimal KMC practices and to solve any concerns raised by QI team members.

Our study was a single-centre quality improvement initiative. The limitation of the study was that the morbidity data was not evaluated. The data on weight gain during KMC, details on KMC continuation after discharge for each baby was not prospectively collected. We demonstrated feasibility and sustainability of a simple quality improvement approach for increasing the initiation of KMC in eligible preterm neonates in a tertiary care hospital with a busy level 2 SNCU. This was achieved within existing resources during COVID pandemic and was sustained by monthly audits via virtual meetings involving all team members.

Conclusions

COVID-19 pandemic has affected the KMC practices in our SNCU. Lack of clear guidelines / training about continuing KMC in COVID-19 times has further lead to decrease in KMC practices. Training and awareness regarding the benefits of KMC and proper sanitization and hand hygiene for both healthcare providers and KMC providers need to be enforced to continue this good practice in the NICUs and the community. Quality improvement initiative is a simple cost effective approach which has improved the initiation of KMC in our study without addition of extra manpower.

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