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Translating evidence into practice in childbirth: A case from the Occupied Palestinian Territory

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ABSTRACT

Objective: To investigate possible changes in practices during normal childbirth by implementing interventions which reduce the frequency of: intravenous fluids; bladder catheterization; analgesia; artificial rupture of membranes; oxytocin use for augmentation; vaginal examination; episiotomy, and increase: mobility; oral intake of fluids; and initiation of immediate breastfeeding.
Design: An operational research design.
Setting: A referral governmental hospital in the Occupied Palestinian Territory (oPt) between 2006 and 2010.
Participants: 2345 women (baseline: 134 women, intervention: 1860 women, post-intervention: 351 women) and 17 providers (10 midwives and 7 physicians).
Interventions: Multifaceted interventions; a combination of on-the-job training, audit, and feedback, supported by a core team and informal meetings.
Main outcome measures: Change of practices during normal childbirth according to best evidence and the WHO recommendations.
Findings: Significant sustained improvements in practices during childbirth from baseline to post-intervention including artificial rupture of membranes, liberal use of oxytocin to augment normal labour, intravenous fluids, frequency of vaginal examinations, oral intake, immediate breastfeeding and routine episiotomy ($P < 0.005$). There was positive change in the mobility during labour, but this change was not sustained after 9 months from intervention to post-intervention. The usage of analgesia did not change.
Key conclusions: Certain changes in practices during normal childbirth were possible in this hospital. A combination of on-the-job training with other interactive approaches increased midwives' awareness, capacities and self-confidence to implement fewer interventions during normal labour.

1. Introduction

Childbirth is a natural process which in some instances requires medical interventions. The mother who gives birth requires care, support, technical competence and medical remedies. In the era of "skilled provider" and "access to obstetric care", most deliveries in the Occupied Palestinian Territory (oPt) occur in hospitals,[1] increasing the risk for unnecessary medical interventions.[2] The WHO identified six core dimensions to quality in health care; effective, efficient, accessible, acceptable, equitable and safe.[3] Based on a recent Cochrane systematic review[4]; safety, effectiveness, woman-centred care and efficacy were drawn as four main dimensions to the safety and quality in maternity care.[5]

Normal childbirth has several different definitions.[6] The WHO defined normal birth as: "spontaneous in onset, low-risk at the start of labour and remaining so throughout labour and delivery. The infant is born spontaneously in the vertex position between 37 and 42 completed weeks of pregnancy. After birth mother and infant are in good condition".[7] However, while the ICM added that normal childbirth involves no medical, surgical or pharmacological interventions,[8] the Canadian definition contrasted that it might include some basic interventions according to evidence such as augmentation of labour, artificial rupture of membranes, pharmacologic and non-pharmacologic pain relief, intermittent foetal

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auscultation, and managed third stage of labour.[9] Normal childbirth in the Palestinian context matches the WHO and the Canadian definitions. During normal labour, the current evidence suggests the following gold standard. Women should be allowed to eat, drink,[10] be mobile,[11] and have continuous support[12] as they desire. Oxytocin for augmentation,[13] vaginal examinations,[14] artificial rupture of membranes[15] and episiotomy[16] should only be used when indicated. Bladder catheterization should not be used[13] routinely and all women should be supported to breastfeed their newborn.[17]

Although midwives assist normal births in the oPt,[18] they follow a medical model of care,[19] which focuses on interventions and risks.[20] A descriptive study[21] in eight Palestinian hospitals reported that care practices during childbirth were not consistent with current recommendations. In this study, we assess the current practices as well as changes to these practices using multiple research methods.

The assessment methods were multiple, using a variety of informants, instruments and observations to document the process and outcomes of care. Our assessment prior to the intervention found that care of women during childbirth was suboptimal.[22] Therefore, we decided to change common and unnecessary practices. We used observations to document the details of care during childbirth in the intervention and post-intervention phases. Thus, the study follows an analytic process of change and obstacles to change in a real care giving Labour/Delivery Ward (LDW).

The aim was to improve the quality of intrapartum practices by increasing mobility, oral intake of fluids, and immediate breast-feeding, and reducing use of routine intravenous fluids, bladder catheterization, analgesia, artificial rupture of membranes, oxytocin use for augmentation, vaginal examination, and episiotomy. The method of change occurred across time and was based on multifaceted interventions,[23,24] according to their feasibility, visibility, and efficiency[23] in the Palestinian context.

2. Methods

2.1. Study design and setting

2.1.1. Operations research

An operational research (OR) design[25] was applied including face-to-face, semi-structured interviews with postpartum women and maternal health care providers (midwives and physicians) in the baseline and from observation checklists during and after intervention.[26]

OR is a research conducted in real life, which follows certain steps,[27,28] and aims at understanding the complexities of a system considered as a living organism.[28,29] Utilized since the 1940s in the military and industrial complex,[28] its value in public health has recently been acknowledged in resource poor settings[29] by using available resources to achieve optimal outcomes,[27] and by overcoming barriers to the quality of health services.[27] The close relationship of the researcher with implementers in the field and effective monitoring and evaluation are two key elements of OR.[25] Understanding the complexities of childbirth in a complex fragile health system[30] in a politically unstable country were core.

The study was conducted in a referral governmental hospital, with 4000 births per year. The hospital receives both low and high-risk pregnant women and is used as a main teaching hospital for medical, midwifery and nursing students from various Palestinian universities.

2.2. Phases of the study

2.2.1. Phase 1: baseline

Mixed methods (quantitative and qualitative) were used to assess the structure, the process of care and the patterns of interactions, behaviours, learning, power and decision-making over 6 months during the years 2005 and 2006 (Fig. 1). We reported on the quality of care[18] and the difficult working

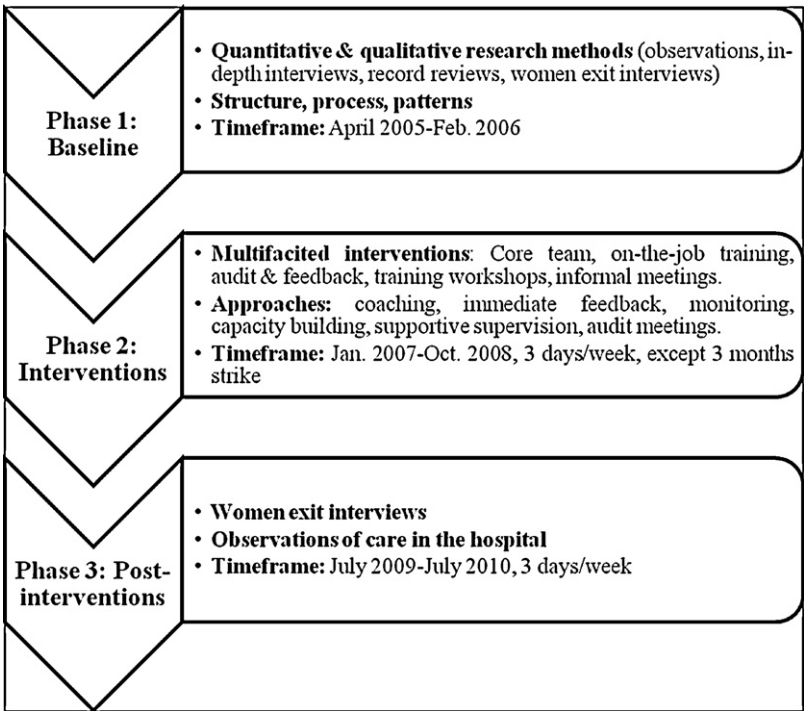

Fig. 1. Phases' timelines, methods, intervention strategies and approaches.

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conditions of the health care providers elsewhere.[31] In this paper, we used reports on actual clinical practices by the maternal health care providers' and women. Research instruments were developed and piloted by the first author, and discussed and reviewed by a senior researcher colleague. We interviewed maternal health care providers and their managers by using semi-structured questionnaires during August and September 2005 for midwives and nurses and between February and March 2006 for physicians. The content of the questions included socio-demographics, clinical practices, responsibilities, working conditions, management, supervision, obstacles, and training needs. The semi-structured questionnaire used for women's exit interviews aimed to explore the women's perceptions of practices during childbirth, women–provider interaction, satisfaction with birth experience, and choice of place of birth. The questionnaire was piloted on 12 postnatal women who were not included in the sample and modified for clarity. Women exit interviews were conducted in August and September 2005.

During the assessment phase, all but one (refusal) of the providers (31) were interviewed. In this paper, we will use interviews with midwives (10) and physicians (7 out of 8). We have excluded the nurses (n = 14) from this analysis because they do not participate in women's care in the LDW. The women's exit interviews were conducted with a convenience sample of all mothers (159) who gave birth in the hospital for 2 consecutive weeks with no refusals. In this analysis, we excluded a total of 25 women; for giving birth before arrival or delivered by elective caesarean section as the latter not have had a labour. All interviews were conducted in Arabic and took place in the hospital. The providers' interviews were conducted by the PI, each lasted 45–60 min and were scheduled according to the providers' convenience time. Women's interviews were conducted by a midwife trained field worker and each lasted 15–30 min before discharge.

2.2.2. Phase 2: interventions

The interventions were multifaceted; they consisted of a cycle of on-the-job training, audit and feedback,[32] conducted over a period of 19 months, supported by a core team in informal meetings. On-the-job training involved support of a senior midwife facilitator for 6–8 h 3 days per week. We used evidence from the Unified Palestinian National guidelines,[33] WHO manuals[7,14] and Cochrane database to inform practice change. Audit of actual practices was integrated into the on-the-job training process through a monitoring process. The actual care was observed and documented by our two midwife field assistants. Feedback was given to the team during quality improvement interactive audit meetings every 2–3 months. During these meetings, the observed common practices were presented and compared with previous months. Positive change was encouraged and areas of poor improvement were discussed to identify obstacles and possible solutions. Training according to the team's specific needs was sometimes tailored and conducted during the audit meeting. We conducted five training workshops during the intervention phase. Informal meetings were conducted with managers and midwives periodically to understand barriers and to elicit providers' opinions of the ongoing interventions. Finally, a core team of four senior midwives was identified as champions to support other staff and embed a sense of ownership. We observed and documented the details of actual care during childbirth for all pregnant women of singleton pregnancies, whom labour and birth occurred between 7 AM and 4 PM, on 2–3 days per week. Because of financial limitations, we functioned between 7 AM and 4 PM, 2–3 days a week. Inclusion criteria were assessed by our midwives field assistants who implemented the on-the-job training. Exclusion criteria included those women expected to give birth after our departure from the LDW, who delivered after 4 PM, or who had multiple pregnancies or obvious morbidities upon admission. We observed the care for 2146 pregnant women. In this analysis, we excluded 286 women for the following reasons; gestational age less than 37 weeks, vaginal breech, problems during pregnancy, birth before arrival, and all women who delivered during the 3 months of the strike of the hospital employees in 2007. Those women who remained for analysis were 1860. Regular cross-checking with the birth register for selected women was conducted through field visits by the first author.

2.2.3. Phase 3: post-intervention

Nine months after the end of the year and a half of the intervention phase, we went back to check the sustainability of changes. We used the same observation checklist from the intervention phase to observe details of care provided for women during childbirth. We calculated the sample for the post-intervention observations based on comparing two proportions for certain indicators between the baseline and intervention phases using online Russ Lenth's power and sample size calculator.[34] We allowed the detection of 10% variance between proportions, with a 90% power and an Alpha 0.05. The calculated sample size was 330 women to be observed. We added 53 observations allowing for 16% potential exclusions for high risk conditions. Thus, we observed the care of 383 women. For this paper, we excluded a total of 32 (8%) women from analysis for the following reasons: birth before arrival, vaginal breech, complicated previous obstetric history and gestational age less than 37 weeks as those women might influence the results. The remaining number of women for analysis was 351 women. The data were collected by a third midwife who was not involved in the intervention phase, during 2–3 days a week.

2.3. Method of observation and observation checklist

Observations were focused on routine care practices during childbirth which were carried out in the LDW. During the intervention period, only one field midwife remained in the LDW facilitating the adoption of best practices. During the post-intervention, the field midwife remained in the LDW.

To audit practices, we used an observation checklist consisting of 34 variables that tracked the process and outcomes of care for women during childbirth from admission to the end of the first

Table 1
Variables included in the quantitative observational checklist.

Variables	
Age[a]	Episiotomy[a,b]
Gravida/Para[a]	Perineal Laceration[b]
Gestational age[a]	Position of birth
Intravenous fluids[a,b]	Length of labour[a]
Oral intake[a,b]	Problems during delivery[a]
Oxytocin IV[a,b]	Skin to skin contact[b]
Walking[a,b]	Immediate breastfeeding (within the first hour after birth)[a,b]
Showers[b]	Infant sex
Other exercises[b]	Weight[a]
Analgesia[a,b]	Apgar score[a]
Problems during labour[a]	Suction[b]
Cervical dilation on admission[a]	Bag & Mask[b]
Artificial/spontaneous rupture of membranes[a,b]	Newborn complications
Bladder catheterization[a,b]	Maternal problems immediately after birth
Frequency of vaginal examinations[a]	Problems during postpartum
Number of different providers conducted vaginal exams[a]	Birth attendant[a]
Type of delivery[a]	Newborn care attendant[a]

[a] Variables used in this paper.
[b] Yes/no variables.

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hour after birth (Table 1). We developed this checklist after reviewing tools developed for the same purpose[35,36] using a user-friendly format that suits the local context. The checklist is a yes/no instrument, with the exception of some variables which needed to be filled out. We piloted this checklist in a different hospital for 1 month by 16 midwives followed by a 1 day evaluation meeting for feedback.

2.4. Analysis

Descriptive statistics, frequency counts and percentages were produced. The difference between means was tested by independent *t*-test and one way ANOVA. For all analyses *P*-value of less than 0.05 was considered significant. The difference between the two proportions of women per phase and parity was tested by Chi-squared and Fisher's exact test. Further analysis was conducted to the group of women stratified by parity using descriptive statistics, frequency counts and percentages. Data were analyzed using IBM SPSS 18.

2.5. Ethical consideration

Written permission was obtained from the Ministry of Health (MOH). The MOH forwarded the written approval to the hospital. Oral permission was obtained from the hospital and maternity ward managers and midwives. Verbal informed consent was obtained from each woman and providers before the interview and observations. Confidentiality and voluntary basis of participation with rights to refuse without any consequences were always ensured to all participants.

3. Findings

3.1. Demographic and obstetric characteristics of women and socio-demographic characteristics of health care providers

The total number of women included in this study throughout the 3 phases was 2345 women. Of those, we observed the actual care provided during normal childbirth for 2211 woman; 1860 woman during the intervention phase and 351 women during the post-intervention phase. There was no significant difference between the age of women in the three phases ($P > 0.05$). Of the total women, 70% were of young age between 16 and 29 years, the mean (SD) was 26.8 (5.68) years. 21% of women were primiparae. In the baseline group ($n = 134$), 60% of the women interviewed had ten years or more of education and 76% live in rural areas.

A total number of 17 health care providers, ten midwives who were female, and seven physicians who were all males were interviewed.[31]

3.2. Reported practices

In the baseline phase, the majority (16/17) of providers reported that they routinely administer intravenous fluids to labouring women, and only six out of 17 reported that they would allow women to drink. Of the 17 providers, 13 reported that they allow women to walk during labour and perform routine episiotomy to all primiparae women. The majority of the midwives reported that they encourage immediate breastfeeding after birth. Labouring women are usually received by a physician who examines them and decides if they need to be admitted to the LDW. Almost all midwives (9/10) reported that they always repeat the vaginal examination immediately after the admission to the LDW and subsequently every 1–2 h.

The providers' reports regarding indications for the use of oxytocin to augment labour were not clear. Of the 17 providers, 11 reported that they commence oxytocin during normal labour if the woman is 3–4 cm dilated, with artificial rupture of membranes and mild contractions. However, few reported that they would commence oxytocin routinely after artificial rupture of membranes or if the woman had either weak contractions or cervical dilation less than 4 cm. The providers also reported that they use oxytocin without the use of infusions pumps machines, continuous foetal monitoring or partograms.

The midwives are responsible for observing and regulating intravenous oxytocin during labour.[31] They reported that they regulate and monitor the rate of oxytocin manually depending on

Table 2
The prevalence (%) of selected practices performed during childbirth before, during and after interventions.

Practices	Baseline‡	Intervention¥		*P*-Value*	Post-intervention¥	*P*-value**
	2005	2007	2008		2010	
N	134	950	910		351	
Oxytocin	32.1†	10.9	12.1	<0.001	17.7	<0.001
Intravenous fluids	76.9	12.6	13.6	<0.001	27.6	<0.001
Walking	30.6	77.9	68.0	<0.001	34.2	0.453
Oral intake	3.7	59.4	56.1	<0.001	11.1	0.012††
Bladder catheterization	NA	26.4	11.0		15.4	NA
Analgesia	3.7	2.8	4.8	.960	3.7	1.000††
ARM	73.1	67.5	1.9	.396	51.9	<0.001
Immediate breastfeeding	57.5	97.5	97.0	<0.001	93.4	<0.001
Vaginal exams				<0.001		<0.001€
4–7 times	48.5	45.7	33.1		37.0	
8–22 times	14.9	1.5	3.0		6.6	
Episiotomy§ for primiparae***	80§	54.2	46.9	.002	39.1†	<0.001
Episiotomy for multiparae	5.8	2.1	2.7	.048††	3.4	.303

ARM: artificial rupture of membranes.
* *P*-Value calculated between baseline and total cases during intervention phases (2007 and 2008).
** *P*-Value calculated between baseline and post-intervention cases.
§ 13/17 (76.5%) providers reported that episiotomy is routine for primiparae. The rest (4/17) reported that they do episiotomy most of the time for primiparae.
† 41 (30.6%) women reported that they 'do not know' if they were given Oxytocin during their labour.
*** Primiparae proportions: baseline = 30 (22.4%), intervention = 386 (20.8%), post-intervention = 87 (24.8%).
‡ Women's report.
¥ Observations.
†† Fisher's Exact Test because there was at least 1 cell has expected count less than 5.
€ Linear-by-Linear Association (df = 2).

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their available time, and would vary from every 15 min to not at all. However, seven out of ten midwives reported that they try to check intravenous oxytocin drip every 15–30 min.

3.3. Labour, birth and newborn outcomes

All women ($n = 2345$) were term pregnancies. Of all observed women ($n = 2211$), the mean (SD) weeks of gestation were 39.5 (1.17) weeks. The majority of women (80%) were admitted in active phase of labour (cervical dilation more than 4 cm). More than half (58%) of women had a relatively short duration of labour (less than 4 h duration). The majority of women (95%) delivered vaginally, assisted by midwives (84%) and had no complications during birth. During the intervention phase, we documented 40 (2%) women who had postpartum haemorrhage. The majority of the newborns (93%) had no problems; mean for the 5 min Apgar score was 9.7 and almost all (95%) were given immediate care by midwives (Table 4).

3.4. Changes in practices from the baseline to the intervention phase

There was a significant decrease ($P < 0.005$) in the prevalence of augmentation of normal labour with oxytocin, intravenous fluids and the frequency of vaginal examinations from the baseline to the intervention phase (Table 2) and the decrease was significant for both groups of women; primiparae and multiparae ($P < 0.005$) (Table 3). The proportions of women, who were allowed to walk, drink/eat during labour, and breastfeed their newborns immediately after birth were significantly larger in the intervention phase than in the baseline phase (Fig. 2). The proportion of primiparae women who had episiotomy were significantly lower in the intervention than the baseline phase ($P < 0.005$), while the prevalence of episiotomy for multiparae women were less, but not significant from the baseline to the intervention phase. The decrease of the artificial rupture of membranes and the use of analgesia during labour were not significant between the two phases (Table 2).

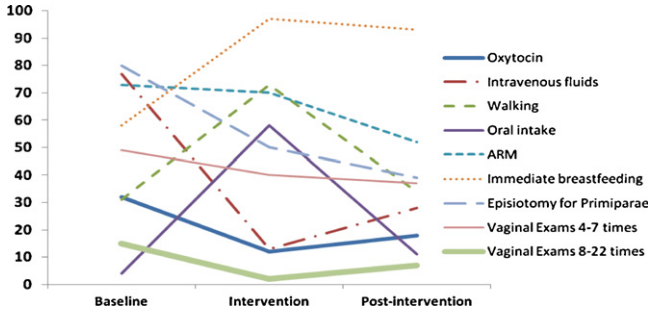

Fig. 2. The rates (%) of selected practices during the baseline and the post-intervention phases.

3.5. Changes in practices from the baseline to the post-intervention phase

There was a significant decrease ($P < 0.005$) in the prevalence of augmentation of labour with oxytocin, intravenous fluids, artificial rupture of membranes, the frequency of vaginal examinations and episiotomy for primiparae from the baseline to the post-intervention phase. The proportions of women who were allowed to drink/eat and breastfeed their newborns immediately after birth were significantly higher from the baseline to the post-intervention phase. The proportion of women who had bladder catheterization was lower from the intervention to the post-intervention (Table 2).

The proportions of primiparae who received oxytocin during normal labour, intravenous fluids, analgesia and high numbers of vaginal examinations were consistently higher than multiparae throughout the three phases. The proportions of multiparae whose membranes were artificially ruptured were significantly lower

Table 3
The prevalence (%) of selected practices performed during childbirth at baseline, during and post-interventions stratified by parity.

Indictors for change	Baseline 2005		PG	Intervention 2007 and 2008		*P*-Value	PG	Post-intervention 2010		*P*-Value
	PG $N=30$	Multips $N=104$	$N=386$	*P*-Value PG[£]	Multips $N=1474$	Multips[§]	$N=87$	*P*-Value PG[€]	Multips $N=264$	Multips[¥]
N	30	104	386		1474		87		264	
Oxytocin	36.7[†]	30.8[†]	19.5	<0.001	9.4	<0.001	27.6	<0.001	14.4	<0.001
Intravenous fluids	83.3	75.0	22.6	<0.001	10.7	<0.001	43.7	<0.001	22.3	<0.001
Walking	36.7	28.8	88.1	<0.001	69.1	<0.001	35.6	<0.001	33.7	0.369
Oral intake	0	4.8	78.2	<0.001	52.4	<0.001[*]	12.6	0.064[*]	10.6	0.104
Bladder catheterization	NA	NA	23.8	NA	17.6	NA	18.4	NA	14.4	NA
Analgesia	10.0	1.9	14.0	0.783[*]	1.2	0.360[*]	12.6	1.000[*]	0.8	0.317[*]
ARM	56.7	77.9	57.8	1.000	72.8	0.256	44.8	0.295	54.2	<0.001
Immediate breastfeeding	40.0	62.5	96.9	<0.001	97.4	<0.001	88.5	<0.001	95.1	<0.001
Vaginal examination				0.010[**]		<0.001[**]		0.230[**]		<0.001[**]
4–7 times	66.7	43.3	59.8		34.2		51.7		32.2	
8–22 times	13.3	15.4	3.4		1.9		12.6		4.5	
Episiotomy	80.0	5.8	50.3	0.002	2.4	0.048	39.1	<0.001	3.4	0.303

PG: primiparae; Multip: multiparae; ARM: artificial rupture of membranes.

[†] 13 (43.3%) of primiparae and 28 (26.9)% of multiparae reported that they 'don't know' if they were given Oxytocin during their labour.

-The following indicators were significantly changed from the baseline to intervention for both PG and multips (*P*-value < 0.05): oxytocin, intravenous fluids, walking, oral intake, immediate breastfeeding, vaginal examination (Linear-by-Linear Association (df = 2)), episiotomy (Fisher's Exact Test because there was at least 1 cells have expected count less than 5).

-The following indicators were significantly changed from the intervention to the pos-intervention phase for both PG and multips (*P*-value < 0.05): intravenous fluids, walking, oral intake, ARM, immediate breastfeeding (Fisher's Exact Test because there was at least 1 cells have expected count less than 5), vaginal examination for multips (Linear-by-Linear Association (df = 2)).

[*] *P*-Value: Fisher's Exact Test because there was at least 1 cells have expected count less than 5.

[**] *P*-Value (Linear-by-Linear Association (df = 2)).

[£] *P*-Value between two proportions of PG women in the baseline and intervention.

[§] *P*-Value between two proportions of multips women in the baseline and intervention.

[€] *P*-Value between two proportions of PG women in the baseline and post-intervention.

[¥] *P*-Value between two proportions of multips women in the baseline and post-intervention.

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Table 4
Maternal and newborn outcomes per intervention and post-intervention phases.

Outcome	Intervention N = 1860	Post-intervention N = 351
Gestational age		
N	1851	
Mean (sd), median	39.52 (1.18), 40	39.49 (1.11), 40
37–40	1472 (79.5)	289 (82.3)
41–44	379 (20.4)	62 (17.7)
Cervical dilation on admission		
N	1851	
Mean (sd), median	5.67 (2.39), 5.00	5.39 (3.60), 5.00
0–3	354 (19)	77 (21.9)
4–7	998 (53.7)	193 (55)
8–10	499 (26.8)	81 (23.1)
Duration of labour		
N	1769	
Mean (sd), median	4.55 (3.02), 4.00	4.743 (4.08), 4.00
<4 h	1001 (56.6)	228 (65.0)
4–12 h	733 (41.4)	110 (31.3)
>12 h	35 (2.0)	13 (3.7)
Apgar score @5 min		
Mean (sd), median	9.71 (0.674), 10	9.81 (0.880), 10
Mode of delivery		
N	1859	
Vaginal normal	1838 (98.8)	339 (96.6)
Vaginal Instrumental	19 (1)	0
Caesarean section	2 (0.1)	12 (3.4)
Delivery attendant		
N	1858	
Midwife	1517 (81.6)	251 (71.5)
Physician	341 (18.4)	100 (28.5)
Newborn care attendant		
N	1859	
Midwife	1823 (98.1)	321 (91.4)
Physician	36 (1.9)	30 (8.6)

from the baseline to the post-intervention phase and were consistently lower among the primiparae throughout the three phases. The proportions of primiparae who breastfed their newborns immediately after birth were significantly higher from the baseline to the post-intervention phase and were consistently lower than the proportion of multiparae throughout the three phases (Table 3).

4. Discussion

In a setting where the barriers to quality care are considerable and the health system is fragile, improvements can still be made although some might not be sustainable. The strength of this study lies in the strategies utilized to influence practices, the selected indicators, and the data collection tool. Similar improvement studies derived their results merely from exit interviews[37] or record reviews,[38] or documented care,[39] and were limited to improving technical nursing observations[40] rather than obstetric practices.

In the present study, we were able to see changes in all but one indicator towards evidence-based practice. There seems to be a trend in the change of certain indicators in relation to parity i.e. vaginal examination, artificial rupture of membranes and breastfeeding. In the medical model, primiparae women are viewed as potentially high risk. In the oPt, the policies in many local hospitals prohibit midwives from assisting primiparae women during birth because primiparae women are classified as potentially high risk women and midwives shall only assist normal and low risk women. This may indirectly influence their labour management by triggering 'restless' providers to commence more interventions. On the other hand, this approach did not influence providers to assist primiparae women in areas where they really need assistance such as immediate breastfeeding.

The discussion will now focus on the most relevant changes which occurred in routine practices during normal childbirth throughout the three phases.

4.1. Sustained improvements

The study demonstrates positive and sustained decrease in 5 important practices; liberal use of oxytocin to augment normal labour, intravenous fluids, artificial rupture of membranes, frequency of vaginal examination, routine episiotomy for primiparae. The results also showed positive and sustained increase in two beneficial practices; oral intake and immediate breastfeeding. The first five practices are complex to change as they are all embedded in routine practices and their routine implementation increases the workload of midwives and creates unnecessary costs in low-resource settings. The improvement in the episiotomy rate for primiparae women in our study was consistent with results reported from Latin America[41] and higher than the results reported from South Africa,[42] China[37] and South East Asia.[38] In our study, it seems that once midwives accepted the benefits of not doing this procedure routinely it was easy to stop the practice, particularly because it saves time and reduces their workload.

Upon discussion, the midwives rationalized their practice that they felt obligated to intervene in normal labour so as not to be accused for not doing their job by physicians and supervisors. Throughout the intervention phase, the midwives indicated that restricting the routine use of these interventions decreased their workload and this could be one main reason for the sustainability of these changes. The decrease in the practice of artificial rupture of membranes was consistent with positive change in a Swedish study.[39] In the Swedish study,[39] the researcher conducted a meeting twice a month with midwives for one year, accompanied by ongoing discussions over 4 years. During this period, the researcher conducted and disseminated the pre-assessment results, developed and discussed guidelines based on the WHO recommendations for care during normal labour. Although our reported baseline prevalence of oxytocin use to augment normal labour was lower than the rates reported from Jordan (95%)[21] and from Egypt (91%),[43] we believe that the baseline prevalence was higher, as one third of women in our study reported that they 'don't know' if they received oxytocin during labour and there was no other way to estimate the baseline rate for its use in normal labour due to inadequate records.

4.2. Improvement not sustained/no change

There was positive change in the mobility during labour, but this change was not sustained. The mobility indictor was slightly improved in the Swedish study[39] and relapsed back 4 months after interventions in the South Africa study.[42] Despite the slight decline of some practices from the intervention to the post-intervention phase, we consider the sustained increase in the prevalence of immediate breastfeeding was of clear benefit for newborns and women and the sustained decrease in the intravenous fluids and the frequency of vaginal examination were beneficial to women. A similar relapse in oral fluid intake and frequency of vaginal examinations were reported in the Swedish study.[39] There are many possible explanations. Firstly, the nature of these practices requires significant commitment, attention and time from midwives to be sustainable. Second, the constant change of the resident physicians could have an influence on this relapse i.e. discouraging mobility and conducting unnecessary vaginal examinations. Third, the absence of policies and structures which might facilitate the sustainability of these practices i.e. access companionship and drinking fountains or cups. Improvements in the skills of monitoring women during labour was reported such as

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measuring maternal blood pressure, checking foetal heart rate and uterine activity every hour was reported.[44]

In our study, Palestinian women have a relatively short labour which was consistent with the results of a previous randomized controlled study from the oPt.[45] Considering this finding, we considered a frequency of four or more vaginal examinations during normal labour to be unnecessary in most cases. The details on this practice were reported elsewhere.[46]

Despite the fact that epidural analgesia is not available for women in this hospital, we were surprised to find out that bladder catheterization was frequent. Midwives justified the common use of catheterization due to their workload and possible accuse for their inability to follow up on individual needs of women to encourage them to empty bladder regularly during childbirth. Thus, we decided to include it in our intervention plan and worked with midwives to eliminate it. There was no change in the use of analgesia, but the rate was low.[47,48] The most common type of analgesia used during labour was Pethidine; a narcotic analgesic.

Two other similar studies tried to improve the quality of care during childbirth by implementing interventions to change practices. The first, implemented one educational workshop to improve practices during normal childbirth in 10 hospitals in South Africa.[42] Four months later, only two practices, oral fluids and companionship, were improved in two hospitals and a relapse occurred in four other practices from the baseline to the post-intervention phase. The second conducted in an Iranian hospital[49] using training workshops for midwives and physicians. The study has limitations in the design, sample was small; 89 women and midwives were engaged in a dual role providing the care and evaluation. Mobility and oral fluid intake during labour were selected for improvement, but no measurement was provided.

There are limitations in this study. First, we compared data from women's interviews in the baseline phase with checklist observations in the intervention and post-intervention phases. Thus, the results are potentially different because the data collection methods of data collection are different. Our observations during the baseline were as case records rather than using a quantitative checklist and were documented in a separate report.[18] The main aim of the project necessitated conducting a rapid assessment using multiple methods to move quickly to implementation. Secondly, the women's exit interviews sample was small, as no power analysis calculations were conducted and were collected at one point in time which might be insufficient. This may limit the comparison quality between the phases. Despite the obvious substandard care, we elicited women's opinions throughout the assessment to ensure their participation in the process in a context where women are rarely consulted. Thirdly, there was no data from a control hospital, which would have been preferable. This operational study was initiated as a pilot, to examine to what extent change can be introduced and sustained in a low resource politically unstable context. This was the first time a research attempt was allowed in a maternity ward of a governmental hospital and we wanted to take the opportunity to explore the situation of childbirth care. Fourthly, potential conflict of interest for our midwifery field workers or compulsory influence from the research team is very unlikely as none of the research team ever worked in this hospital. Our midwifery field assistants involvement in the project was not their primary role and they had been oriented towards the project's aims and challenges. A third different midwife conducted the post-intervention observations who did not participate in the initiation and implementation of the project. Furthermore, we utilized other methods continuously to validate the change. Thus, any potential compulsory influence on midwives could have vanished after completing the intervention phase and midwives could have completely reverted back to their previous styles of practice, as we did not inform them that we will come back after 9 months to check for sustainability. Finally, there might be other internal factors that we were not aware of that could influenced to the sustainability of practices or not such as the turn-over of midwives and of the head obstetrician. However, we thought that our core team continued to orient new midwives to the change in practices.

5. Conclusion

Our study highlights the gaps in the provision of evidence-based childbirth care in a Palestinian hospital, the improvements during the intervention phase following the implementation of multifaceted complex interventions and the sustainability and relapses after 9 months. It was possible to change practices during normal childbirth in a hospital to a certain extent. This change emerged from the bottom of the health organizational hierarchy by the mid-level providers. We believe the combination of on-the-job training with other interactive approaches increased midwives' awareness, capacities and self-confidence to utilize fewer interventions in normal labour. On-the-job training was a non-threatening, provider-friendly approach, involved audit, feedback, and built rapport, prepared a receptive platform for change, facilitated a smooth integration of evidence into real practice and allowed quality improvement with the use of the available resources. Our results suggest that evidence translation into practice is complex, requires time, sustained efforts, multifaceted interactive interventions and understanding the 'bits' and 'pieces' of the real world. Since the health system, childbirth, quality, change process, hospital environment and humans are complex, evaluating the impact of interventions should occur carefully following a period of time. Finally, our results are likely to be transferable to other Palestinian governmental hospitals, where childbirth practices and context are similar. However, further research is needed to assess the impact of these strategies using the same tool over the three phases.

Competing interest

The authors declare that they have no competing interest.

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