RESEARCH ARTICLE

Who's your coach? The relationship between coach characteristics and birth attendants' adherence to the WHO Safe Childbirth Checklist [version 1; peer review: 1 approved, 2 approved with reservations]

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Abstract

Background: Research demonstrates that coaching is an effective method for promoting behavior change, yet little is known about which attributes of a coach make them more or less effective. This *post hoc*, sub-analysis of the BetterBirth trial used observational data to explore whether specific coaches' and team leaders' characteristics were associated with improved adherence to essential birth practices listed on the World Health Organization Safe Childbirth Checklist.
Methods: A descriptive analysis was conducted on the coach characteristics from the 50 BetterBirth coaches and team leaders. Data on adherence to essential birth practices by birth attendants who received coaching were collected by independent observers. Bivariate linear regression models were constructed, accounting for clustering by site, to examine the association between coach characteristics and attendants' adherence to practices.
Results: All of the coaches were female and the majority were nurses. Team leaders were comprised of both males and females; half had clinical backgrounds. There was no association between coaches' or team leaders' characteristics, namely gender, type of degree, or years of clinical training, and attendants' adherence to essential birth practices. However, a significant inverse relationship was detected between the coach or team leader's age and years of experience and the birth attendants' adherence to the checklist.
Conclusion: Younger, less experienced coaches were more successful in promoting essential birth practices adherence in this population. More data is needed to fully understand the relationship between coaches and birth attendants.

Open Peer Review

Approval Status ? ✓ ?

	1	2	3
version 1 20 Jul 2020	? view	✓ view	? view

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OhioHealth, Columbus, USA
2. **Rosemary Ogu**, University of Port Harcourt, Port Harcourt, Nigeria
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Any reports and responses or comments on the article can be found at the end of the article.

Keywords
checklists, maternal health services, quality improvement, in-service training, provider education, coaching, supportive supervision

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Author roles: George ER: Conceptualization, Formal Analysis, Writing – Original Draft Preparation, Writing – Review & Editing; **Hawrusik R**: Formal Analysis, Software, Writing – Review & Editing; **Marx Delaney M**: Data Curation, Investigation, Writing – Review & Editing; **Kara N**: Data Curation, Investigation, Writing – Review & Editing; **Kalita T**: Data Curation, Formal Analysis, Writing – Review & Editing; **Semrau KEA**: Conceptualization, Formal Analysis, Funding Acquisition, Supervision, Writing – Review & Editing

Competing interests: No competing interests were disclosed.

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Background

Coaching is a successful strategy for changing individuals' performance and behaviors within industries such as sports[1], business[2], and health care[3–5]. Coaching, which differs from clinical training, focuses on strategically supporting someone as they determine how to put knowledge into practice. Among clinicians, there is often a disconnect between theoretical knowledge and practical application of clinical skills[3]. Employing a coaching-based approach can be a critical method to support clinicians' progress from beginner to expert in assessment and intervention decisions[6–8].

Although the literature demonstrates that coaching is an effective method for promoting behavior change, little is known about which coach attributes are effective. This *post hoc*, sub-analysis of the BetterBirth trial used observational data to explore whether specific coaches' and team leaders' characteristics were associated with improved adherence by birth attendants to essential birth practices (EBPs) listed on the WHO Safe Childbirth Checklist (SCC)[9].

Methods

The BetterBirth Trial, a large cluster-randomized controlled trial conducted in Uttar Pradesh, India, demonstrated that a coaching-based implementation of the SCC increased birth attendants' adherence to EBPs, but had no effect on maternal/perinatal health outcomes[9]. The original trial took place in 120 facilities across 24 districts of Uttar Pradesh[9]. At each intervention facility (n=60) and its matched control site (n=60), patients were enrolled two months after the launch of the coaching intervention; health outcomes of women and their newborns were collected at 7 days postpartum[9].

Intervention sites were assigned coaches for 8 months to empower birth attendants to identify and resolve the barriers they faced while using the SCC[4]. Team leaders attended every other visit with coaches to provide supportive supervision. In a sub-set of 30 facilities, independent observers (neither coaches nor staff) documented birth attendant's adherence to practices. Observers recorded data on all practices within a specific time frame (from admission, just before delivery, within 1 minute of delivery, and within 1 hour of delivery); deliveries were observed for 1 or more pause points. Observation of practices was limited to practical and observable interactions between provider and patient or provider actions to ready supplies[9]. Data collection took place 2 months and 6 months after coaching. Only independent observer data from intervention facilities (15 facilities) are included in this analysis, as control facilities did not receive coaching.

Using data collected during the main trial, we conducted a descriptive analysis on the coach characteristics and the relationship of those attributes and adherence to the behaviors on the WHO Safe Childbirth Checklist. We included information from the 50 BetterBirth coaches and team leaders; a subset of which (n=17 coaches or team leaders) provided coaching at facilities where independent observation was completed. Using data from the study hiring database, the variables on coaches/team leaders' gender, age, professional degree, years of clinical training and years of experience were used in the analysis. The roles of coach and team leaders for the analysis were based on the individual's initial role when the trial started as some coaches graduated to team leader roles throughout the trial. All coaches and team leaders were included in the descriptive analysis; only the coaches and team leaders in the subset of facilities with independent observer data were included in the subsequent models. STROBE reporting guidelines were used in the submission of this study[10].

Generalized linear models were constructed, accounting for clustering of births within site, to examine the association between coach characteristics and birth attendants' adherence to EBPs. The models were estimated using generalized estimating equations[11]. Separate models were created for coaches and team leaders. Practice adherence data was collected by independent observers. Practice adherence was calculated as a summary score of the 18 EBPs for each birth and each practice was weighted equally. The EBP score was then assigned to each coach who visited the facility where the observation took place, as coaches attempted to provide at least one coaching session to every birth attendant at a facility. The parameter estimates for the model can be interpreted as the difference in mean EBP scores between the different levels of demographic characteristics in the study. All statistical analyses were performed in SAS version 9.4 (SAS Institute, Cary, NC, USA).

Results

All coaches were female and the majority were nurses. Team leaders were comprised of both males and females; half of which had clinical backgrounds (Table 1[12]). The full complement of coaches and team leaders were relatively similar to the subset of coaches working at facilities where independent observations occurred. The only difference is the proportion of males in the team leader group (63%) and males in the team leader analytic dataset (29%).

There was no association between coach's or team leaders' gender, type of degree, or years of clinical training and providers' adherence to EBPs. However, a significant inverse relationship was detected between the coach's or team leader's age as well as years of experience and the birth attendants' adherence to the checklist (Table 2[12]). As the coach's age increased by 10 years, the mean summary score of the 18 EBP adherence decreased by almost one checklist item (β = -0.93). Similarly, as the coach's years of experience increased the number of EBP decreased slightly (β = -0.13). Similar effects were found for team leaders.

Conclusion

The inverse relationship between the coaches' age and experience and adherence to EBPs suggests that younger, less experienced coaches were more successful in promoting practice adherence. Younger coaches may have been less directive, especially when coaching birth attendants who were older and/or more experienced. Additionally, coaches and team leaders possess various learning styles; the coach foundation training may have been absorbed differently by each.

Table 1. Characteristics of coaches and team leaders.

	Coaches (overall) N=34	Coaches (Included in the analysis) N=10	Team leaders (overall) N=16	Team leaders (Included in the analysis) n=7
Characteristic				
Gender n (%)				
Female	34 (100%)	10 (100%)	6 (37%)	5 (71%)
Male	0 (0%)	0 (0%)	10 (63%)	2 (29%)
Professional degree n (%)				
Physician	0 (0%)	0 (0%)	7 (44%)	3 (43%)
Nurse	31 (91%)	8 (80%)	0 (0%)	1 (14%)
Other (non-clinical)	2 (6%)	1 (10%)	9 (56%)	3 (43%)
Unknown	1 (3%)	1 (10%)	0 (0%)	0 (0%)
Mean age (Years) (Range)	27 (22–54)	29 (22–54)	33 (27–43)	34 (30 – 43)
Mean years of clinical training (Range)	3 (0–4)	3 (0–4)	2 (0–6)	3 (0 – 6)
Mean years of prior experience (Range)	3 (0–25)	4 (1–25)	7 (2–17)	8 (2–17)

Table 2. The relationship between coaches/team leaders' characteristics and birth attendant's adherence evidence-based practices (EBPs).

Coaches (n= 10) (number of observed deliveries = 1052)		
Variable name	**Parameter estimate (95% CI)**	**P-value**
Nurse (1 vs 0)	-0.93 (-2.90, 1.05)	0.36
Years of clinical training	-0.17 (-0.65, 0.31)	0.49
Coach age (10 years)	-0.92 (-1.21, -0.64)	<.0001
Years of prior experience	-0.13 (-0.16, -0.10)	<.0001
Team leaders (n=7) (number of observed deliveries = 906)		
Physician (1 vs 0)	0.53 (-0.67, 1.73)	0.39
Clinical degree (1 vs 0)	0.75 (-0.32, 1.81)	0.17
Years of clinical training	0.13 (-0.09, 0.34)	0.24
Team leader age (10 years)	-1.71 (-3.23 , -0.20)	0.03
Gender (Female vs Male)	0.51 (-0.72 , 1.74)	0.41
Years of prior experience	-0.14 (-0.27, -0.02)	0.02

A potential limitation is the introduction of bias by independent observers. To mitigate bias, observers completed standardized training (with six-month refreshers), which included procedures for using the observation tool in practice and definitions for analyzing EBP adherence. For practical reasons, these observations were performed at nonrandomly selected sites during daytime hours, which potentially limits generalizability to unobserved births[4]. While the number of coaches included in the analytic dataset is small, the total number of observations of care was substantial.

The notion that coaching has positive effects on individual behavior change outcomes is well-supported in the literature. However, a paucity of studies explore the various dynamics between coach and coachee relationships suggests that more information is needed to fully understand the relationship between coaches and birth attendants[13]. One survey of nearly 300 individuals in 34 different countries conducted by the Institute for Employment Studies found that factors such as age and gender of their coach were less important to coachees[14]. The most important quality of a coach to a coachee was that the coach displayed acceptance of the individual[14]. This matches our broader experience at Ariadne Labs, where we have often seen that softer skills (i.e., established relationships between the coach and the coachee, the coach's disposition and personal style) produce higher rates of sustained behavior change, but these factors are difficult to measure. Future research should include a mixed methods approach to explore how factors like personal

styles, cultural dynamics, and hierarchy affect coaching content uptake.

Ethics compliance

At trial initiation, birth attendants and facility staff provided written consent to participate. Before an independent observer collected data, the birth attendant verbally reconfirmed agreement; laboring women who were observed provided written consent. Electronic data were deidentified and stored in a Health Insurance Portability and Accountability Act–compliant database to ensure participant privacy. In directly observed births, women or their surrogates provided written consent for observation. The study protocol was approved by the Community Empowerment Lab (CEL) Ethics Review Committee (Ref no: 2014006), Jawaharlal Nehru Medical College Ethical Review Committee (Ref no: MDC/IECHSR/2015-16/A-53), the Institutional Review Board of the Harvard T.H. Chan School of Public Health (Protocol 21975-102), the Population Services International Research Ethics Board (Protocol ID: 47.2012), and the Ethical Review Committee of the World Health Organization (Protocol ID: RPC 501), and the Indian Council of Medical Research. The protocol was reviewed and reapproved on an annual basis.

Data availability

Underlying data

Harvard Dataverse: Who's Your Coach? The relationship between coach characteristics and birth attendants' adherence to the WHO Safe Childbirth Checklist. https://doi.org/10.7910/DVN/BCMETW[12]

This project contains the following underlying data:

- coachtl_chars.sas7bdat (SAS dataset with demographic characteristics of coach team leaders)
- coachtl_checklist.sas7bdat (SAS dataset with adherence to checklist behaviors in coach team leader facilities)
- Coach_characteristics_DataDictionary.tab (Data Dictionary for the demographic characteristics datasets for Coaches and Coach Team Leaders with variable names, type, length, format, informat and label)
- coach_chars.sas7bdat (SAS dataset with demographic characteristics of coaches)
- coach_checklist.sas7bdat (SAS dataset with adherence to checklist behaviors in coached facilities)
- Coach_CoachTL_Checklist_DataDictionary.tab (Data dictionary for the datasets on adherence to Checklist behaviors listed above with variable names, type, length, format, informat and label)

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Open Peer Review

Current Peer Review Status: ? ✔ ?

Version 1

Reviewer Report 10 August 2020

https://doi.org/10.21956/gatesopenres.14297.r29125

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Somesh Kumar
Jhpiego (an affiliate of Johns Hopkins University), Baltimore, MD, USA

This is a well written paper which shines the light on an important topic: the characteristics of a successful coach. Given the potential investments of the government in hriing of Quality Mentors, the guidance provided by this paper can inform the selection process.
I would recommend clearly describing and differentiating the role of the coach versus a Team Leader. While the role of coach is clear, the concept of team leader is not- who is the team leader; who do they lead, what is their role?

In the abstract, authors mention the use of Bivariate analysis. But in the methods section of the main paper, multiple background characteristics have been mentioned as variables. Any reason why a multi-variate analysis was not attempted?
There is a speculation made in the conclusion related to effect of training of coaches on their effectiveness.Were proficiency levels of coaches tested at any stage? It would have helpful to have that analysis.

Is the work clearly and accurately presented and does it cite the current literature?
Yes

Is the study design appropriate and is the work technically sound?
Partly

Are sufficient details of methods and analysis provided to allow replication by others?
Yes

If applicable, is the statistical analysis and its interpretation appropriate?
Partly

Are all the source data underlying the results available to ensure full reproducibility?
Yes

Are the conclusions drawn adequately supported by the results?
Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Reproductive, Maternal, Neonatal Health; Women's Cancers; Health Systems/Quality of Care

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Author Response 26 Oct 2020

Katherine Semrau, Ariadne Labs | Brigham & Women's Hospital and Harvard TH Chan School of Public Health, Boston, USA

Thank you for the feedback, Dr. Somesh Kumar. We have taken your feedback and responded below.

1. While the role of coach is clear, the concept of team leader is not- who is the team leader; who do they lead, what is their role? Team leaders' primary role was to support facility and district leaders as they strengthened the health care systems' facilitation of the use of the WHO Safe Childbirth Checklist. Team leaders also provided supportive supervision to coaches during facility visits, in which both coaches and team leaders were present, which included activities to increase motivation, collect data, provide feedback, and problem-solve around barriers to behavior change.

2. In the abstract, authors mention the use of Bivariate analysis. But in the methods section of the main paper, multiple background characteristics have been mentioned as variables. Any reason why a multi-variate analysis was not attempted? In this ad-hoc, substudy of the BetterBirth trial, we were interested in exploring which specific coach characteristics, if any, had a relationship with the behavioral outcomes of interest versus the overall composite of coach and team leader characteristics. We saw in the main BetterBirth study that the overall composite of coaches and team leaders demonstrated higher adherence to essential birth practices.

3.Were proficiency levels of coaches tested at any stage? It would have helpful to have that analysis.
At every training, we conducted pre-testing and post-testing for assessing pre- to post-test change in knowledge. For continuous capacity building, we conducted surprise and scheduled supervisory coach and team leader field visits and evaluated their knowledge and skills using observation tools. Additionally, we conducted regular refresher training sessions with coaches and team leaders utilizing pre- and post-tests.

Competing Interests: No competing interests were disclosed.

Reviewer Report 03 August 2020

https://doi.org/10.21956/gatesopenres.14297.r29124

Rosemary Ogu
Department of Obstetrics and Gynaecology, University of Port Harcourt, Port Harcourt, Nigeria

The Safe Childbirth Checklist is a tool recently introduced by the World Health Organization (WHO) to reduce maternal morbidity and mortality[1]. The WHO Safe Childbirth Checklist aims to help frontline healthcare workers prevent avoidable childbirth-related mortality/morbidity as seen in sub-Saharan Africa[2].

“Who’s your coach? The relationship between coach characteristics and birth attendants’ adherence to the WHO Safe Childbirth Checklist"[3] is a multi-authored study on the characteristics (gender, professional degree, age, years of clinical training, and years of prior experience) and effectiveness of a coach with respect to adherence to essential birth practices by birth attendants who were coached. The authors present a sub-analysis of the BetterBirth trial using observational data to explore whether specific coaches’ and team leaders' characteristics were associated with improved adherence to essential birth practices listed on the WHO Safe Childbirth Checklist.

The Introduction clearly demonstrates that coaching is an effective method, yet little is known about the attributes or characteristics of a coach that make them more or less effective for promoting behavior change.

A descriptive analysis of the coach characteristics from the 50 BetterBirth coaches and team leaders formed the manuscript basis. Independent observers collected data on adherence to essential birth practices by birth attendants who received coaching. Bivariate linear regression models were constructed to examine the association between coach characteristics and attendants’ adherence to practices.
The results showed no association between the Coaches gender, type of degree, or years of clinical training, and attendants’ adherence to essential birth practices. However, a significant inverse relationship was detected between the coach age and years of experience and the birth attendants’ adherence to the checklist.

The authors concluded that younger, less experienced coaches were more successful in promoting essential birth practices adherence in this population and more data is needed to fully understand the relationship between coaches and birth attendants. The conclusions drawn are adequately supported by the results and the limitations were discussed. The Conclusion may be re-titled Discussion and Conclusion.

This is a well thought out study that provides information necessary to promote behavior change. The statistical analysis and interpretation are appropriate. The work is clearly presented and cites current and relevant literature. The study design is appropriate and the work is technically sound.

Independent observers (neither coaches nor staff) documented the birth attendant's adherence to practices. The details of methods and analysis have been provided to allow replication by others. The authors have adhered to the STROBE reporting guidelines and the source data underlying the results are available and archived with a digital object identifier.

References

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3. George E, Hawrusik R, Marx-Delaney M: Who's Your Coach? The relationship between coach characteristics and birth attendants' adherence to the WHO Safe Childbirth Checklist. *Harvard Dataverse*. 2020. Reference Source

Is the work clearly and accurately presented and does it cite the current literature?
Yes

Is the study design appropriate and is the work technically sound?
Yes

Are sufficient details of methods and analysis provided to allow replication by others?
Yes

If applicable, is the statistical analysis and its interpretation appropriate?
Yes

Are all the source data underlying the results available to ensure full reproducibility?
Yes

Are the conclusions drawn adequately supported by the results?
Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Maternal Health

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Author Response 26 Oct 2020

Katherine Semrau, Ariadne Labs | Brigham & Women's Hospital and Harvard TH Chan School of Public Health, Boston, USA

Thank you for the feedback, Dr. Rosemary Ogu!

Competing Interests: No competing interests were disclosed.

Reviewer Report 03 August 2020

https://doi.org/10.21956/gatesopenres.14297.r29123

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Eugene Tuyishime
[1] University of Rwanda, Kigali, Rwanda
[2] OhioHealth, Columbus, Ohio, USA

Thank you for giving me the opportunity to review this research article.

The authors talked briefly in the background section about coaching, however a more detailed literature review is needed in order to justify the gap in the literature this study is trying to address.

More details about the study design are needed. It is unclear to the reader why the subset of 10 coaches and 7 team leaders was included in the final analysis. What happened to the remaining coaches and team leaders in table 1.

The choice of methodology should be justified. Is this the best method to determine the attributes of a good coach? Or a mixed-method would be better? The weakness of the method and lack of a validated tool to measure coaching performance should be recognized.
In addition, the choice of factors included in the model needs explanation.

In the discussion section, the fact of having only female coaching should be explained.

In the conclusion section, the sentences below are speculations and should be moved to the discussion section: "Younger coaches may have been less directive, especially when coaching birth attendants who were older and/or more experienced. Additionally, coaches and team leaders possess various learning styles; the coach foundation training may have been absorbed differently by each."

Is the work clearly and accurately presented and does it cite the current literature?
Partly

Is the study design appropriate and is the work technically sound?
Partly

Are sufficient details of methods and analysis provided to allow replication by others?
Yes

If applicable, is the statistical analysis and its interpretation appropriate?
I cannot comment. A qualified statistician is required.

Are all the source data underlying the results available to ensure full reproducibility?
Yes

Are the conclusions drawn adequately supported by the results?
Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Global health, Quality improvement, Maternal Health, Anesthesia, and Medical Education.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Author Response 26 Oct 2020

Katherine Semrau, Ariadne Labs | Brigham & Women's Hospital and Harvard TH Chan School of Public Health, Boston, USA

Thank you, Dr. Eugene Tuyishime; please find out responses below to your feedback:

1. More details about the study design are needed. It is unclear to the reader why the subset of 10 coaches and 7 team leaders was included in the final analysis. What happened to the remaining coaches and team leaders in table 1. It was not feasible to have an independent observer collect data at every single BetterBirth site; consequently, only a subset was selected for this portion of the study.

2. The choice of methodology should be justified. Is this the best method to determine the attributes of a good coach? Or a mixed-method would be better? The weakness of the method and lack of a validated tool to measure coaching performance should be recognized. In addition, the choice of factors included in the model needs explanation. As noted in the paper, this was a post-hoc, sub-analysis of previously collected data and the authors acknowledged in the conclusion that future research should include a mixed-methods approach to further explore this topic.

3. In the discussion section, the fact of having only female coaching should be explained. Coaches were nurses who worked in childbirth facilities and females predominantly occupy this role in this region of India.

Competing Interests: No competing interests were disclosed.