Feasibility of a Birth-cohort In Pakistan: Evidence For Better Lives Study

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Research

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Abstract

Background

Evidence for Better Lives Study (EBLS) is an endeavour to establish a global birth cohort with participants from resource poor settings across the globe. It aims to investigate mediators and moderators of child development and wellbeing; it envisages informing policy and practice change to promote child health and wellbeing globally. Pakistan is one of the resource poor settings taking part in this global birth cohort; we report the feasibility of establishing such a birth cohort in Pakistan.

Method

From March 2019 to July 2019, 153 third trimester pregnant women were identified, using community health worker registers, and approached for baseline demographics and a number of maternal wellbeing, mental health, support related information and stress related biomarkers in a peri-urban area of Islamabad Capital Territory. From October 2019 to December 2019, we re-contacted and followed 121 between 8-24 weeks postnatal period. All interviews were done after consent and data was collected electronically.

Results

150 (98%) third trimester pregnant women consented and were interviewed, 111 (74%) provided bio-samples and 121 (80.6%) were followed up postnatally. Their mean age and years of schooling was 27.29 (5.18) and 7.77 (4.79) respectively. Majority (82.3%) of the participants were housewives. Nearly a tenth were first time mothers while 63% of women reported current pregnancy to have been unplanned. Overall wellbeing and mental health were reported to be poor (WHO-5 mean scores 49.41 (32.20) & PHQ-9 mean scores 8.23 (7.0)). About 22% of women reported four or more adverse childhood experiences; 12.2% reported intimate partner violence during their current pregnancy. During the postnatal follow up visits, 58% of the women reported breastfeeding their infants.

Conclusion

The study demonstrated Pakistan site could identify, approach, interview and follow up women and children postnatally, with a high response rates for both the follow up visits and bio-samples. Thus, a larger scale pregnancy birth cohort study in Pakistan is feasible to conduct.

Key Messages

- Pre-feasibility Uncertainties: sampling, contacting & re-contacting participants, consent & data collection (including bio-samples), acceptability of interview content.
- Key Feasibility findings: ability to identify, recruit, interview, collect varied types of biological samples and re-contact participants for follow-up interviews was done successfully.
- Implications of feasibility findings: Pakistan site can establish a birth cohort with all its requisites and be part of the EBLS global birth cohort initiative.

Introduction

Background & Rationale

Intrauterine life and early childhood are phases of rapid growth and development with high susceptibility to myriad exposures- both helpful and detrimental to future health and wellbeing of the child [1]. Birth cohorts are important to learn about these exposures and their subsequent impact on early and late child development and wellbeing. Evidence for Better Lives Study (EBLS) is one of the first initiatives in the world aiming to establish a multisite birth cohort, comprising 12000 children across the low and middle-income countries (LMIC), who will be followed from intrauterine life to early childhood. One of the main goals of this global cohort will be to assess variety of maternal and environmental exposures and their longer-term effects on child wellbeing and resilience [2, 3].

Childhood mental health is a key determinant of later mental, physical, and social health in life of children [4]. Yet, it is an aspect of child development and health that is not paid attention to especially in low resource settings. Similarly, exposure to violence during childhood has been proven to be detrimental for children's cognitive, emotional, and social development and overall wellbeing. Not only does violence pose an immediate risk of bodily harm for children, it also predisposes them to a cascading chain of lifelong physical, mental, and social health risks, disease and early death [5]. However, low and low-middle-income countries face major challenges in developing effective strategies to improve child mental health and preventing and responding to violence against children (VAC). The first step in this direction would be to have robust data about the determinants, risk factors, mediators and moderators of VAC.

EBLS will also focus on understanding how children can reach their full potential and build resilience and how VAC can be reduced through interventions, given their contextual realities. In the process, perhaps discovering cross-cultural, and culture-specific mechanisms underlying developmental trajectories. In summary, the biological, psychological, environmental, social, and cultural influences which shape children's lives and inform their experiences and behaviors will be the focus of this global cohort set up across diverse resource settings. The current paper reports the feasibility of establishing such a birth cohort in Pakistan which is one of the resource poor countries taking part in this global initiative called the Evidence for Better Lives Study [3].

Objectives:

1) To test the feasibility of identification, recruitment, and follow-up of 150 third trimester pregnant women residing in the peri-urban area of Islamabad Capital Territory, Pakistan 2) to test the feasibility of administering instruments to assess varied constructs of maternal and environmental exposures 3) to test the feasibility of collecting biological samples from the participants and 4) to report initial estimates on pre-natal & perinatal exposures in Pakistan.

Methods

Setting

The feasibility or the pilot study was conducted between March and December 2019 in Tarlai Kalan, Pakistan. It is a densely populated, semirural, semi-literate, low-to-middle income area which is part of the Islamabad Capital Territory (ICT), with a population of approximately 150,000. Over the last decade a sizable proportion of

population have become residents of Tarlai Kalan as well as the ICT area. This influx of population over the years have originated from the neighboring provinces of Punjab and the north western province of Khyber Pakhtoonkhwa causing ICT to show a large intercensal growth rate[6]. Tarlai Kalan is one of the 50 Union Councils[1] of ICT and is fairly representative of the low and middle-income strata of the general population of neighboring populations[7]. The average household has four to eight children and mixed modes of income including irregular jobs, daily-wage work, small businesses e.g. shops and skilled work and government & private sector employment.

Participants

150 third trimester pregnant women were recruited through convenience sampling, and baseline data were collected. We followed up these 150 participants at two to six months (08-24 weeks) postpartum period as a follow up from October to December 2019. In all 121 out of 150 women were followed up and interviewed.

Eligibility

1) over 18 years of age, 2) permanent resident of Tarlai Kalan, and 3) at least 29 weeks pregnant at the time of interview. All participants that could understand the national language Urdu was also one of the criteria. While for the follow-up, women who were within their 08-24 weeks postpartum, and had had a live birth were approached. Those who had a stillbirth, loss of pregnancy or neonatal death were excluded.

Recruitment

Recruitment and interviews were conducted at the Rural Health Center which is the primary health care facility servicing the population of Tarlai Kalan. We also used Health Houses to recruit and conduct interviews. A Health House is one of the rooms that the government employed community health workers called Lady Health Workers (LHWs) use for providing preventive and promotive MNCH services to the community they reside in. In all 34 LHWs were asked to identify eligible women within their communities. While the midwife at Rural Health Center which is called a Lady Health Visitor (LHV) was asked to identify eligible women coming to the facility for their antenatal check-ups. Thus we piloted identifying and recruiting our sample directly from the community through LHWs and from the primary care facility through the midwife. Postpartum follow-up was done using the same strategy. Mothers who were recruited from the antenatal clinic were invited via phone calls to the health facility, others to their respective LHW's Health Houses.

Consent & Biological Sampling

Eligible women provided a written informed consent for interview and for the biological samples. Consent to follow-up the mothers and their babies was also obtained at the recruitment stage. Biological samples involved Dry Blood Samples (DBS) and hair. The informed consent was obtained through trained research staff who ensured all participants understood confidentiality and their right to withdraw at any time during the study. Screening, baseline and follow-up interviews, as well as biological samples were collected by the same trained research staff who had postgraduate-level education in health and social sciences. Hair samples were collected for accumulated cortisone and cortisol level measurements over the course of the pregnancy. Cortisone, in

addition to cortisol, gives an estimate of the amount of protection from stress available to the growing foetus. Any hair treatments or local scalp steroidal application was checked prior to taking their hair samples.

Data Management

Appropriate measures were implemented to ensure access restriction of data, confidentiality, completeness and quality. All data were electronically collected on smartphones (tablets) and uploaded to data server sans personal identifiers.

Additionally, personal identifiable data were collected and stored in hard copies locally under lock and key, for later contact during the postpartum follow up.

[1] Union Council is the smallest geo-political and administrative unit of Pakistan, usually consisting of populations between thirty and thirty-five thousand (30,000-35,000). It is serviced by a primary health care facility housed with medical doctor, midwife, vaccinator, dispenser, community health workers called Lady Health Workers and their supervisor called Lady Health Supervisor.

Results

Feasibility

Figure-1 describes the number of participants at each stage and details of their participation. 70 out of the 150 interviews were conducted in the health facility, 80 at the LHW health houses. 111 of 121 follow up interviews were conducted in health houses, nine in the health facility, and one interview was conducted at participant's home near the health house. We did not collect dry blood samples from six mothers' who were known cases of hepatitis B or C in the interest of research staff safety. No mothers were on blood-thinning medication.

74% of participants agreed to provide samples of Dry Blood Spot samples, and 70%, hair samples. Some participants refused all biological samples, others consented to one of the two types of biological samples. Commonest reasons given fear of needle prick, short of time to sit through the hair samples being drawn or of being worried about evil eye/magic associated with hair strands (ie the cultural belief of hair being used for magic spells or harm befalling on those who would give hair strands).

Six, as noted above were excluded for DBS due to potential risks posed to the research staff handling pins. Others, excluding those who refused all sampling due to time constraints, fear of needles/pins.

121 out of 150 participants (80.66%) could be successfully followed up during the postpartum period. Out of 29 who did not have a follow-up interview, 8 did not show up or were unavailable after being contacted by the research team multiple times. Most of these participants were recruited at the health facility rather than the community through LHWs. Showing up for the interview required planning, time, and some costs for these participants which they mentioned on subsequent contact. One participant was temporarily absent while another refused to participate as her family disapproved of her being followed up or being part of the study.

Baseline & Follow-Up Findings

Salient findings are summarized in tables 2 & 3.

Maternal Constructs

As depicted in Table-2, only 8% of respondents with a mean age of 27.29 (SD: 5.18) were pregnant for the first time. Most already had 2 or more children with a mean parity of 2.28 (SD: 1.54). Participants had on an average 7.77 years of schooling, about 2 years less than the husbands' ie 9.40 (SD: 4.80). While 17.4% of the participants had never gone to school. 82.3% had no personal income through employment. Most respondents had access to antenatal healthcare and ultrasound facilities. However, a majority (61.3%) reported that their current pregnancy was unplanned.

Attitudes towards physical punishment of children showed slight inclination towards endorsing it (Mean 2.68; SD: 1.02), where 25% of the participants believed that physical punishment did not cause harm to children.

Neighbourhood cohesion, closeness and ties were reported to be moderate. Neighbourhoods were reported as relatively safe (Mean: 1.74; SD: 0.62) but unclean, with more than half of the mothers reporting littering in the street they lived in. About a quarter said there were intoxicated people on the streets in their localities.

In all 81% of respondents had experienced at least one adversity in their own childhood. Over one-fifth (21.8%) of the mothers had experienced four or more adversities out of all the listed 18 adverse experiences; over half (55.1%) had witnessed a household member being treated violently; about a quarter reported physical and emotional abuse, as well as physical neglect while they were children.

Most participants reported high perceived support from family, friends, and partners. However, 31.3% reported experiencing at least one form of Intimate Partner Violence (IPV) in the last 6 months and 46.3% reported having had a lifetime experience. Emotional violence was the highest that was reported; with over one-third of participants having experienced it; followed by physical violence being at 12.2%.

Mean Patient Health Questionnaire nine items (PHQ-9) scores were 8.23 and 38.1% of participants had symptoms of depression at baseline. However, in the postnatal period 14.9% of the respondents reported symptoms of depression (PHQ-9 score ³10). The severity was also, in contrast to the baseline, exclusively between moderate to moderately severe (10.7% and 4.2%, respectively), with none of the participants reporting symptoms of severe depression. While WHO's Wellbeing Index mean score was low at 49, signifying poor perceived overall wellbeing. Only 8.2% of the participants reported substance use.

Participants gave mixed responses to prenatal attachment items in all categories. Almost half the participants (47.3%) never imagined calling their babies by name and over a half didn't think the baby had a personality. Yet, 43.8% almost always thought that their actions affected their baby. A vast majority (84.9%) never let anyone put their hands on their abdomen to feel the baby move; yet 60.3% almost always enjoyed feeling the baby move themselves.

[Table-3]

On follow-up, as shown in Table-3, mean score of Birth-MARQ (emotional) was high; signifying negative emotions concerning childbirth experience; at 22.67 (SD:6.95). Over one-third (35.5%) of respondents had

extremely negative emotions at the time of birth. Only 12.4%; about 1 in 8 mothers; reported to have had extremely positive emotions at the time of birth. Whereas 19.8% of mothers; 1 in 5; felt extremely positive emotions when recalling their birthing experience at the time of interview.

New-born's constructs

As shown in Table 3, 40% of babies were between 10-15 weeks (mean age: 14.19 weeks; SD: 5.09). 71.7% were born at term, with 12.1% pre-, and 16.1% post-term. 29% of the babies were delivered through a planned or an emergency Caesarean Section. Mean weight at birth was 6.65 lbs (SD:1.43). Three mothers had twins, increasing the total number of participating babies to 124.

Only 12% of the babies had been held by the mother within 5 minutes of birth. Furthermore, only half of all babies were held by their mothers within the first hour after birth.

In sharp contrast to "*Intention to Breastfeed*"; recorded at baseline with 98.6% mothers intending to breastfeed only 58% actually exclusively breastfed their babies on the follow up visit. However partially breast feeding (ie breastfeed and milk substitute) was common with 32% of mothers doing partial breastfeeding.

Discussion

The main objective of this feasibility or pilot study was to explore whether a birth cohort with biological samples could be established in Tarlai Kalan, Islamabad Capital Territory, Pakistan. This involved testing the full strategy to identify, recruit, and follow up 150 pregnant women in their third trimester; administer varied instruments capturing multiple constructs, including those with sensitive questions; and obtain biological samples. We could do all of the set our objectives of this feasibility study with good recruitment and responses rates both for biological samples and electronically collected interview-based data. Thus, illustrating that Pakistan can feasibly be involved as one of the sites for the global birth cohort called Evidence for Better Lives Study [3].

Between 26-30% of our participants did not provide biological samples. The most frequent reason being the worry about getting late. This concern from women, especially from lower socioeconomic strata, with large families to care for, and cultural norms holding them accountable for their time and activities, is not surprising in the local milieu. Although less frequent, and perhaps less visible, these norms permeate the better-off classes too. Adeel et. al. note in their analysis of Pakistan Time-Use Survey that 80% of all trips outside the house are by males in Pakistan [8]). A qualitative study in a hospital in Rawalpindi by Armaan Rowthor et. al. found gender norms to be a major cause of constrained agency, decision-making, and prenatal anxiety amongst pregnant women [9]).

The other objective was to gain initial estimates of key variables. We learned that although there is high community and family support, neighbourhood disorder, widespread p-IPV, perceived stress, poor wellbeing, and alarming frequency of prenatal depression, are major challenges in improving maternal & child health. IPV during pregnancy and otherwise as well as prenatal depressive symptom have been consistently found to be higher in low- and lower – middle-income countries (LMICs) and especially the south Asian region. Our findings are also comparable to earlier studies in Pakistan, reporting similar prevalence rates of depressive symptoms [10-12]. Postnatal depression was markedly lower than prenatal depression, in line with local literature, which

estimates the prevalence £ 25% [13-15]. This may point towards strong social and biological determinants of prenatal depression in the Pakistani context.

The overall characteristics of participating mothers, and gender disparities in education and employment, closely resembled those of the general population of Pakistan as reported in PDHS 2017-18 [16]. Respondents belonged to diverse socioeconomic backgrounds. Most respondents had regular access to healthcare and ultrasound facilities. Despite access, high unmet need for family planning among our currently pregnant sample was clearly noted, with over half of the mothers reporting unplanned/unwanted, pregnancies. This finding to is in-keeping with the recent demographic and health survey of Pakistan [16]. The reasons, as described in surveys and studies, are varied across socioeconomic class and ethnicity. Power dynamics also play a role, with only about 7% of current female contraceptive users in Pakistan having made the choice alone to do so along with lack of informed choice [16].

A significant proportion of the sample did not believe physical punishment for children did not harm them. This is another contextually embedded finding previously reported in literature that represents the general norms of punishment across our setting [17]. While women's exposure to four or more adversities in their childhood was also a frequent finding in our sample with respondents themselves having experienced physical punishment. Most frequently reported adversity was having witnessed a household member being treated violently. As per literature concerning childhood adversity carries has an intergenerational link [18].

Lifetime substance use was found to be very low among our participants despite higher stress levels and depressive symptoms. This has been a consistent finding in other studies and reports from Pakistan [19, 20]. It is primarily a reflection of the cultural norms surrounding women's acceptable behaviour in semi-urban middle-class Pakistan, as well as other conservative societies. The picture changes when high and low-income groups are studied in isolation [21]. Another factor responsible for lower substance use amongst women worldwide could be preferred processing mechanisms in men and women. Where men are more likely to externalize extreme stress through aggression and substance use, there is a propensity for women to internalize, leading to anxiety and mood disorders [22, 23]

The prenatal attachment levels seemed to have been low at first glance, across all categories, with mean values being below the mid-point. Perhaps this can be attributed to the fact that over half of our respondents did not plan their current pregnancy. However, another important consideration is that of the cultural context. For example is considered shameful for pregnant women to talk about their pregnancy and childbirth with family and or express happiness about it since pregnancy is associated with a sexual act [24]. Beliefs about "evil eye" also deter mothers from openly expressing joy and letting people feel their baby's movements [25]. Furthermore, in our context caring for many children and the extended families living together with feeling fatigued and stressed most of the time does not let women think and enjoy the pregnancy thus expressing as poor prenatal attachment [26].

We collected data on emotions at the time of childbirth, at the postpartum follow-up, which was reported as largely negative. About one-third of the participants had childbirth through Caesarean Section. The trends worldwide show a major shift towards Caesarean Sections between 1990 and 2014, more marked in the high income countries and more in the populations with a higher wealth quintile [27, 28]. Pakistan is no exception,

despite being a LMIC, the rising trends can be attributed to wealthier women having greater access to Caesarean Section option.

About 29% mothers held their babies within the first half hour after birth. Guidelines on the subject ask for immediate skin-to-skin contact between mother and child, foregoing the routine practices of weighing, bathing the baby etc. [29-31]. Almost no participant had child's metrics from the time of birth in her records except birth-weight. Another indicator of healthcare services for mother and child in Pakistan lagging behind international guidelines.

Only 58% of mothers were exclusively breastfeeding at the postpartum follow up. 32.2% reported using milk substitutes along with breastfeeding in contrast to the 98.6% who showed intent at the prenatal visit. Beliefs about mother producing "insufficient" milk, baby not being satiated, formula milk or cow milk being more nutritious are widespread in Pakistan, which may have caused this. Other factors include maternal depressive symptoms, stress, resumption of household chores in the postpartum period, poor technique, lack of knowledge about the importance of breastfeeding, family physician's advice, peers' advice, and lack of facilities and services to initiate proper breastfeeding after birth[32, 33].

Based on our findings we propose that determinants of maternal health and child development are in poor state in Pakistani low and middle-income communities. Further research into the subject is essential to understand and mitigate these problems.

The main strengths of our feasibility study were its approach to identify eldigible sample using both facility based and a community based approach, high response rate at recruitment, postpartum follow-up and acquiring varied biological samples, using constructs informed by expert opinion through a delphi technique [34], use of validated instruments used in all other EBLS sites making interesting cross cultural comparisons[3].

Specific to the Pakistan site, this study is novel in the local context in that it takes prenatal life as a period of exposure to adversity and aims to collate these findings with follow-up data over the childhood years.

Our recruitment strategies eventually worked. We had initially planned involving LHWs bringing mothers along from their communities to the health facility for recruitment into our study. This had some initial issues where LHWs could not accompany the pregnant women on the said day for interviews at the facility. Additionally, LHWs reported many women found it inconvenient to come to the facility on the given day to be interviewed by the research team. However, our later approach to have participants come to the community based health houses of the LHWs (which are nearby to the households of the women) was far better for both recruitment and follow ups.

However, this strategy is not without its limitations. All of the population on Tarlai Kalan is not covered by LHWs thus leading to a potential source of selection bias for the eventual birth cohort. Other challenges during the study included scheduling visits with the Lady Health Workers, who are extremely busy and found it difficult to arrange follow up visits for our sample leading to some potential delays. For example, polio campaigns, were a recurring activity during our study period in which LHWs participate. We mitigated this issue by coordinating with the LHWs which were not involved in the polio campaigns. Similarly, during the postpartum follow up phase there was an outbreak of dengue fever in Tarlai Kalan leading to stopping of field activities for nearly two weeks.

Thus for the next main round of study, the timelines of the main study should have these delays incorporated from the outset.

Conclusion

We believe that it is feasible to conduct a large-scale longitudinal birth cohort study with biological samples included in Islamabad Capital Territory, Pakistan using the lessons learnt from the current feasibility study. Recruitment during pregnancy from both facility and community settings with sensitive questions and biological samples is possible. Mothers, once recruited, can readily be contacted and followed up. Attrition is likely to remain low with the current strategy of involving community health workers.

A prospective cohort study will help us better understand child wellbeing and its risk factors. This will in turn help with formulating effective strategies to improve physical, mental, and social health of both mothers and children in Pakistan to help build a brighter and securer future of our children.

Declarations

Ethics approval and consent to participate

Ethics approval for this project were taken from:

-The University of Cambridge, School of the Humanities and Social Sciences, United Kingdom (Reference number: 18/180) and Human Biology Research Ethics Committee of the University of Cambridge, UK (Application No: HBREC.2018.27)

- National Bioethics Committee of Pakistan Health Research Council, Pakistan (Reference No: No.4-87/NBC-364/19/1487)

- The Institutional Ethical Review Committee of the Health Services Academy, Islamabad, Pakistan (Reference No: No. 7-82/IERC-HSA/2018-06)

Consent for publication

We can submit the copy of the information sheet and consent form used in the study on request.

Availability of data and materials

Further information about the datasets used and/or analysed can be available upon request from the corresponding author.

Competing interests

No competing interests.

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Authors' contributions

YA developed the first draft of the manuscript, collected data, interpreted results. FA provided inputs in the design of the study, interpretation of the findings and revising the draft manuscript. AD collected data, helped organize information for first draft. AH & SS conceived and designed the study, provided oversight to the conduct and quality of data collection. Both AH and SS functioned as joint mentor authors for the manuscript. All authors approved the final draft of the manuscript.

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Tables

Table 1- Summary of Measures & Instruments

Constructs	Measures	Source	Scoring & Interpretation	Used at	
				Antenatal	Postpartum Follow up
Sociodemographic Profile	Household composition & household equipment	DHS (adapted) [35]	18 items Multiple choices	.	
	Main & current occupation		6 items various: multiple choice, yes/no, open		
	Social status (Subjective)	MacArthur's Subjective social Status Scale [36]	1 item 10-point scale; computed a subscale for participants who rated themselves 3 or Less		
	Grades passed & level of education	The Hoffmeyer-Zlotnik / Warner-Matrix of Education	2 items Number of grades passed and highest level of education attained		
Prenatal Information	Prenatal information: Previous pregnancies, current pregnancy planned, current pregnancy unwanted, preconception weight, height, health conditions during current pregnancy, current pregnancy single/multiple, antenatal healthcare visits, long-term medications, rubella & tetanus	Reproductive health and pre-natal information Adapted from: South Asian Birth Cohort (START) [37] & the Millennium Study	21 items Various: multiple choice, yes/no, open	.	

	vaccination, supplementation, ultrasound during pregnancy, intention to breastfeed			
	Attitudes towards physical punishments [38]	Attitudes toward spanking Deater-deckard et al.	5 items; Likert scale 1-5 Higher scores indicate higher endorsement	
Characteristics of the Father	Cohabitation status, age of the father, education, occupation, employment status, ethnicity	Adapted from: South Asian Birth Cohort (START) [37] Millennium Cohort Study (NatCen 2003)	10 items; Various: multiple choice, yes/no, open	.
Community Characteristics	Neighbourhood cohesion	Neighbourhood & Violent Crime Scale [39]	5 items; scored 1-4	.
	Neighbourhood Closeness		4 items; scored 1-4	
	Neighbourhood disorder		9 items; scored 1-4	
	Neighbourhood ties		2 items; scored 1-5	

			(Total items: 20)	
Adverse Childhood Experiences	Household member alcoholic/substance user, Household member mentally ill, Household member imprisoned, Parental divorce, Household dysfunction, Emotional abuse, Physical abuse, Sexual abuse, Physical neglect	WHO ACE-IQ (adapted) Questionnaire [40]	18 items*; Mixed: Yes/No, 4-point Likert scale 1-4	·
Social Relationships	Partner supportiveness,	Parent Relationship Quality & children's Behaviour [41]	5 items; 5-point Likert scale: 1-5	·
	Intimate Partner Violence,	WHO Multi-country Study on women Health & Domestic Violence against Women (VAWI) [42]	13 items; Lifetime prevalence: Yes/No Prevalence during last 6 months: Likert scale 1-4 Categories: Physical-6 items, emotional-4 items, sexual- 3 items	·
	Social support	The Multidimensional Scale of Perceived Social Support [43]	12 items; Subscales: Family, friends, significant other	

			5-point Likert scale: 1-5
Psychological Traits & Mental Health	Well-being,	WHO-5 (five) well-being Index [44]	5 items; 6-Point Likert scale: 0-5 score out of 25, then multiplied by 4: 0-100. 100 signifying best imaginable wellbeing
	Depression,	PHQ-9 [45], The Suicidal Behaviours Questionnaire-Revised	9 items 4-point Likert scale Possible scores 0-27 (Cut-off ³ 10 for presence of depression)
	Suicidality	SBQ-R [46]	1 item; 5-point Likert scale: 0-4
	Perceived stress,	Perceived Stress Scale [47]	10 items; 4-point Likert scale 1-4
	Aggression	The Brief Aggression Questionnaire	12 items; 4 subscales of 3 items each to measure trait aggression: physical aggression, verbal aggression, anger, and hostility. 5-point Likert scale 1-5
	Adult ADHD symptoms,	Adult ADHD Self-Report Scale: ASRS version 1.1 (adapted) [48]	3 items; 5-point Likert scale: 1-5

		Project on social Development from Childhood to Adulthood	2 items 5-point Likert scale 1-5		
	Self-control	Brief Self-Control scale (adapted) [49]	8 items Likert scale 1-5	.	
				.	
Substance Use	Alcohol use, Smoking, Substance use	Alcohol, Smoking and Substance Involvement Screening Test (ASSIST) – Adapted version WHO ASSIST Working Group (2002) [50]	9 items Lifetime Prevalence: Yes/No 6-month prevalence: Likert scale 1-5	.	
Prenatal Attachment	Pregnancy Related beliefs	Prenatal Attachment Inventory – Revised [51]	18 items; 4-point Likert scale 1-4	.	
Mother's Birth Memories	Mother's subjective emotional experience of birth	Birth Memories & Recall Questionnaire-adapted (BirthMARQ) [52]	5 Items; 7-point Likert scale: 1-7	-	.
New-Born's Constructs & Measures					
New-born's Health & Well-being	Birth weight, Length, Occipito-frontal head circumference Mode of childbirth, Full-term/premature birth, ICU admission, Illness since birth	Norwegian Mother & Child Cohort study [53]	Various: multiple choice, yes/no, open	-	.

Time of initiation of mother-child contact, Breastfeeding,	Questionnaire for Breastfeeding Mothers [54]	4 items; Multiple choice	-

*whereas other sites in EBLS used 19 out of 31 questions from the ACE-IQ questionnaire

Table 2- Summary of Findings at Baseline N=150

Baseline Maternal Measures (N=150)	Mean (SD) or N %
Sociodemographic Profile	
Age (Years)	**27.29 (5.18)**
Education	
· Years of Education	**7.77 (4.79)**
Occupation:	82.3%
· housewife	17.7%
· Employed	
Socio-economic Status	
McArthur Subjective Social Status Scale £ 3	29.5%
Mean household effects (Assets) Max. score: 16	6.55 (1.86)
Prenatal Health & Attitudes	
Obstetric History	
· Parity	**2.28 (1.54)**
· Nulliparous	8%
· Previous Still Births	5.3%
· Previous Abortions	32.7%
· Previous premature birth (prior 37 weeks' gestation)	8%
· Unplanned pregnancy	**61.3%**
Access to Basic Health Facilities	
· Access to Ultrasound	97%
· at least one antenatal check-up in the 1st trimester of pregnancy	80%
-	
Intention to breastfeed	**98.6%**
· Intended duration of breastfeeding (Months)	16.50 (9.24)
Attitudes towards physical punishment	
· Believes spanking does not harm children	

	25%
Characteristics of the husband	
Living with the participant (not away because of employment/divorce etc.)	93.9%
Age	32.14 (6.98)
Education	9.40 (4.80)
Paid jobs in last 12 months	93.9%
Community Characteristics	
Neighborhood cohesion	2.09 (0.83)
Neighborhood Closeness	2.22 (0.75)
Neighborhood Disorder	1.74 (0.62)
· Drunk/intoxicated People on Street	23%
· Vandalism in Neighbourhood	20%
· Litter on Streets	57%
Neighborhood Ties	1.93 (0.90)
Adverse Childhood Experiences*	
ACE-IQ Score	**1.87 (1.90)**
· Any ACE Item experienced	81%
· ≥ 4 ACE Items experienced	21.8%
· Physical	26.5%
· Emotional	26.6%
· Sexual	4.8%
· Household Member Violently Treated	55.1%
· Physical Neglect	24.5%
· Alcoholic/Drug Abuser Household Member	8.2%
· Depressed Suicidal/Mentally ill Household Member	6.3%
· Imprisoned Household Member	6.1%
· Parents ever Separated or Divorced	4.8%
Social Relationships	
Partner Supportiveness/Relationship Score	**4.17 (0.87)**
Intimate Partner Violence	
IPV-LT (any form)	31.3%
Pregnancy IPV (any form)	12.2%

· Physical	8.8%
· Sexual	25.9%
· Emotional	46.3%
Perceived Social Support	
· Social support from family	4.06 (0.92)
· Social support from friends	3.53 (1.15)
Maternal Wellbeing, Mental Health & Other Constructs	
Wellbeing WHO-5	**49.41 (32.20)**
Depression (PHQ-9)	**8.23 (7.0)**
· Depressed (³ 10)	38.1%
· Moderate Depression	23.8%
· Moderately Severe Depression	10.9%
· Severe Depression	3.4%
Suicidality Scores (SBQ-R)	0.30 (0.85)
Perceived Stress Scores	2.14 (0.58)
· Stress more than every second day	27%
Aggression Scores	2.09 (0.55)
Self-Reported Adult ADHD	1.70 (0.63)
Self-Control	4.14 (0.58)
Substance Use	
· Lifetime prevalence	**8.2%**
· 6 Month prevalence	**8.2%**
Substances Used	
· Tobacco	6.2%
· Sleeping pills	1.33%
· Other	0.66%
Prenatal Attachment	
Anticipation	**2.29 (0.73)**
· Almost never Imagine calling baby by name	47.3%
· Almost always wonder what baby looks like	28.1%

Differentiation	**1.99 (0.65)**
· Almost never think the baby has a personality	51.7%
· Almost always thought her actions affected baby	43.8%
Interaction	**1.95 (0.66)**
· Almost never let other people put their hands on the abdomen	84.9%
· Almost always enjoy the baby move	60.3%

Table 3 - Summary of post-natal follow up (Mothers N= 121; Babies N=124)

Newborn's Health & Wellbeing	
Measures	**Mean (SD) or N %**
Age of baby at the interview (in weeks)	**14.19 (5.09)**
<10 weeks	23.3%
10 -15	40.3%
16 - 20	21.7%
21 - 24	14.5%
Weeks pregnant at delivery	39 (2)
Preterm (37th week or earlier)	12.1%
38 – 40	71.7%
41 - 42	16%
Type of delivery	
Normal Vaginal Delivery (Not induced)	56%
Induced and Vaginally	13%
Planned Caesarean	15%
Unplanned, Emergency Caesarean	14%
Held the baby	
Immediately	8.8%
Within five minutes	3.2%
Within half an hour	16.9%
Within an hour	27.4%
After C-section with general anesthesia	9.6%
Cannot remember	0.8%
After one hour	33.3%
Gender of baby	
Boys	47%
Girls	53%
Twin Pregnancy	2.47%
Birth Weight (in lbs.)	6.65 (1.43)
Breastfeeding	

Breastfed Exclusively	58%
Breastfed and used milk substitute	32.2%
Fed just milk substitute	8%
Mother's Wellbeing	
Mother's Birth Memories-Emotional (Max score 35; Higher score means negative emotions)	**22.67 (6.95)**
Strongly Agree that:	
· Had extremely positive emotions at the time of birth	12.4%
· Had extremely negative emotions at the time of birth	35.5%
· Had mixed positive and negative emotions at the time of birth	21.5%
· Currently have extremely positive emotions when recall birth experience	19.8%
· Currently have mixed positive & negative emotions when recall birth experience	27.3%
Depression PHQ-9 Score	5.29 (4.27)
Depressed (³10)	14.9%
Moderate depression (10-14)	10.7%
Moderately Severe Depression (15 – 19)	4.2%
Severe depression (20 – 27)	0%

Figures

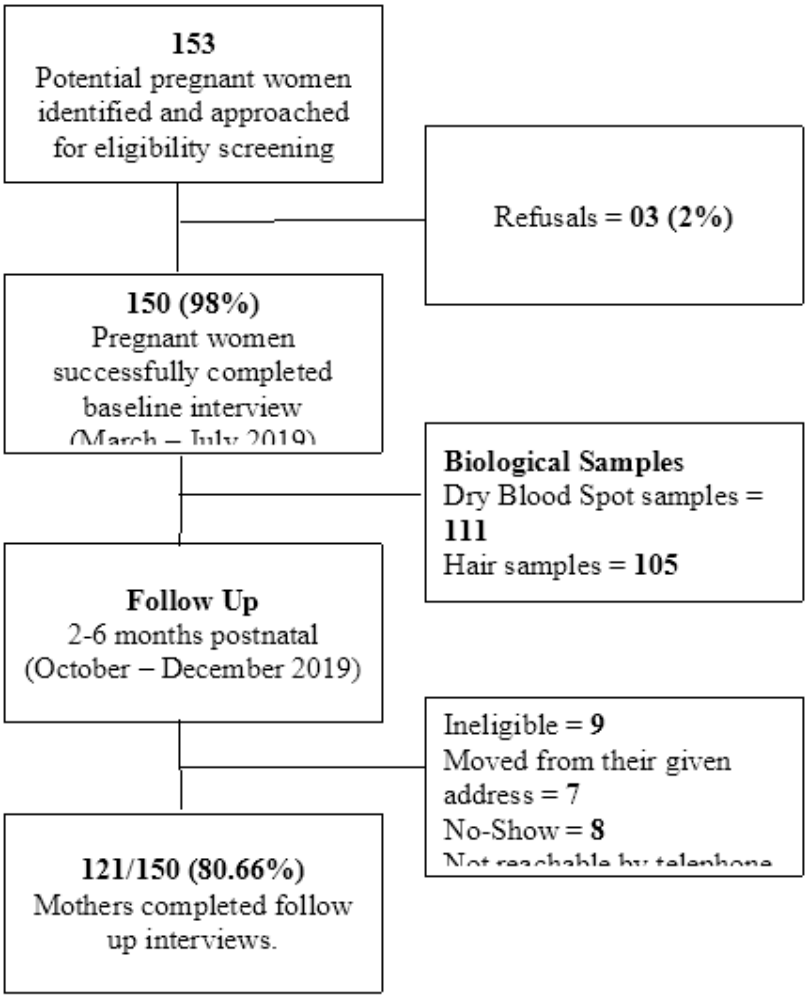

Figure 1

Figure-1 describes the number of participants at each stage and details of their participation.

Supplementary Files

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- AdditionalFile1Figure1.docx
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