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Develop and implement a scalable model for improving the identification and management of possible serious bacterial infections in young infants in Uttar Pradesh, India

Submission date
07/11/2022

Recruitment status
No longer recruiting

Registration date
10/11/2022

Overall study status
Completed

Last Edited
16/07/2025

Condition category
Infections and Infestations

[X] Prospectively registered
[X] Protocol
[_] Statistical analysis plan
[_] Results
[_] Individual participant data
[_] Record updated in last year

Plain English summary of protocol
Background and study aims
Infections account for more than a third of newborn deaths in the state of Uttar Pradesh, India. The WHO has laid out a comprehensive guideline for the early identification and management of possible serious bacterial infections (PSBI) in young infants (i.e. those aged under 60 days), ideally in health facilities, but also extended to the community where referral is not possible. Components of these guidelines have been addressed through multiple programs launched by the government of India. However, there continue to be several weak links in the chain from the identification of PSBI to its successful treatment of young infants that have been further disrupted and exacerbated during the COVID-19 pandemic.
The aim of this study is to co-develop a scalable and pandemic-resilient model that adopts a mother and infant-centric design to improve the identification and management of PSBI in young infants (i.e. those aged under 60 days) in this context.

Who can participate?
Infants aged 0-59 days born to usual residents of the study area

What does the study involve?
Formative research involving mothers and family members of young infants, health workers, providers and functionaries, health stakeholders at the village, block, district and state levels will be conducted to gather data for the co-development process.
The proposed PSBI model will be co-developed with mothers, health workers, providers and relevant health stakeholders, and implemented and refined within a rural block (population about 146,000; annual birth cohort about 3,000) in Kanpur Nagar across four 3-monthly cycles. The model aims to achieve over 80% coverage of PSBI identification in the target population, which will be evaluated through a concurrent follow-up of all births during the study period. The researchers will also conduct a cascade analysis to assess effective coverage and barriers and bottlenecks at each step of the PSBI chain.

What are the possible benefits and risks of participating?
This model will be implemented in one rural block of Uttar Pradesh, and if proven to achieve high coverage, it will be considered for scaling up across the district and state. The model is expected to significantly reduce death rates in young infants due to infections in the study population, and potentially across the state if scaled up. Sick young infants participating in the evaluation will benefit from referral to an appropriate facility.
The risks of participating in the study are less than minimal with a low likelihood of occurrence. Risks may include a potential breach of confidentiality, and embarrassment or discomfort discussing potentially sensitive issues or during the process of observation. To minimize these risks, the study team will be trained in aspects of research ethics, as relevant to their role. In addition, rigorous procedures will be implemented to protect the privacy of study participants including secure storage of data and anonymization of participant information.

Where is the study run from?
The study is being run by the Community Empowerment Lab from Kanpur Nagar, Uttar Pradesh (India)

When is the study starting and how long is it expected to run for?
December 2021 to June 2025

Who is funding the study?
Bill & Melinda Gates Foundation (USA)

Who is the main contact?
1. Aarti Kumar, aarti.kumar@celworld.org
2. Vinay Pratap Singh, vinaypratap.singh@celworld.org

Contact information

Type(s)
Principal investigator

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Additional identifiers

Protocol serial number
CEL/IEC/202209/001 Dated: Research Protocol v3.0, 5 Aug 2022

Study information

Scientific Title
Implementation research to develop and evaluate a mother-infant-centred, pandemic-resilient, scalable model for improving the identification and management of possible serious bacterial infections in young infants in Uttar Pradesh, India

Acronym
PSBI-IR

Study objectives
A mother-infant-centred approach designed to facilitate early identification and timely and appropriate management of possible serious bacterial infections will achieve at least 80% coverage of possible serious bacterial infection (PSBI) identification.

Ethics approval required
Old ethics approval format

Ethics approval(s)
1. Approved 30/09/2022, Community Empowerment Lab Institutional Ethics Committee (F-09, 9th floor, F-Block, Tower-B, Shalimar Grand, 10, Jopling Road, Lucknow-226001, India; +91 (0)522 4932314; irb@cel.org.in), ref: CEL/IEC/202209/001
2. Approved 09/02/2023, WHO ERC (20, AVENUE APPIA – CH-1211 GENEVA 27 – SWITZERLAND) ref: Protocol ID: ERC.0003838
3. Approved 05/05/2023, Community Empowerment Lab Institutional Ethics Committee (5/9, Vineet Khand, Gomti Nagar, Lucknow, 226010, India; +91 (0)522 4932309; irb@cel.org.in), ref: CEL/IEC/202405/001

Primary study design
Interventional

Study design
Mixed methods implementation study

Study type(s)
Other

Health condition(s) or problem(s) studied
Possible serious bacterial infections in young (<2 months old) infants

Interventions
This study is designed as a mixed methods implementation research that will involve human-centred design techniques to co-design the PSBI implementation model with relevant stakeholders as an integrated set of scalable components, followed by implementation, concurrent evaluation and data-driven refinement over 12 months in one rural block (population approx. 150,000; annual live birth cohort approx. 3000) of Kanpur Nagar district.

An integrated care pathway will be co-designed with various stakeholder groups and will include: (a) health system interventions to improve counselling of mothers on danger signs, (b) a helpline to report illnesses in young infants and conduct active case finding, teleconsultation, care coordination and referral facilitation, (c) various health system interventions to improve task shifting, availability of supplies, quality of care and accountability.

Intervention Type
Other

Primary outcome(s)
1. Scalable model/proof-of-concept to improve identification and management of PSBI at a population level at each 3 months of the total of 4 cycles. This is a non-quantifiable, descriptive outcome, which will describe the entire PSBI model as implemented.
2. Coverage of PSBI identification in the target population (against an assumed PSBI incidence of 10% among all young infants) will be assessed based on programmatic data - the number of cases notified to the system and confirmed as PSBI as a fraction of all infants in the population who have completed 2 months of follow-up.

Key secondary outcome(s)
1. Effective coverage of PSBI estimated through cascade analysis with the target population:
1.1. Population in need: This is the number of infants among all study participants who were reported to have ANY illness in the previous 15 days, as assessed on days 15, 30, 45, and 60 (mother's report)
1.2. Service contact coverage, defined as the proportion of the population in need that contacts a health service. This will be measured as the proportion of infants among the population in need who had any contact with the helpline or an ASHA worker or any other designated health functionary with regards to the illness and will be assessed on days 15, 30, 45, and 60, as well as programmatic records.
1.3. Input-adjusted coverage, defined as the proportion of the population in need that contacts a health service that is ready. Health service readiness (numerator) will be assessed based on whether the contact with the health service translated into an assessment where the infant was assessed for PSBI and other danger signs. The numerator will be derived from the helpline records which will be updated in real time if and when the assessment is done. The denominator will be the same as the population in need.
1.4. Intervention coverage, defined as the proportion of the population in need that receives health service. This will be calculated as infants who have initiated treatment out of those infants who were confirmed to have PSBI (the "population in need" indicator for subsequent coverage indicators in the cascade will be reset to those infants who were confirmed to have

PSBI). The numerator and denominator will be derived from programmatic records, and the numerator will be verified against the mother's report of treatment initiation from evaluation follow-up on days 15, 30, 45 or 60.
1.5. Quality-adjusted coverage, defined as the proportion of the population in need that receives health service according to standards. The numerator (whether care received was as per standards) will be derived from treatment case records of the sick infants from the providers/ facilities where care was sought from and verified against the mother's report from the evaluation follow-up on Day 8 of treatment initiation. The denominator will be infants confirmed to have PSBI from the programmatic records.
1.6. User adherence-adjusted coverage, defined as the proportion of the population in need that adhered to the prescribed treatment. The numerator, the number of mothers who adhered to the prescribed treatment and follow-up visits post-discharge/as part of community case management, will be derived from the evaluation follow-up on Day 8 of treatment initiation. The denominator will be infants confirmed to have PSBI from the programmatic records.
1.7. Outcome-adjusted coverage, defined as the proportion of the population in need where a positive health outcome was achieved. The numerator, the proportion who were clinically well 8 days after treatment initiation, will be derived from the evaluation follow-up on Day 8 of treatment initiation. The denominator will be infants confirmed to have PSBI from the programmatic records.
2. Process outcomes, such as:
2.1. REACH (of the helpline amongst low socioeconomic status [SES] mothers) based on helpline reach and SES data collected at 30 days postpartum
2.2. Mother's knowledge of danger signs, based on a questionnaire administered to the mother at 30 days postpartum
2.3. ADOPTION (proportion of mothers who self-report illnesses in their young infant to the helpline). This will be recorded in the Helpline database on a real-time basis, which will capture the details of who notified the illness whenever a call is made.
2.4. ACCEPTABILITY (proportion of mothers who availed referral out of all those who were advised referral). This will be captured in the Helpline database on a real-time basis, when the mothers who were advised referral will be followed up to track compliance over the next 48-72 hours.
2.5. System readiness (availability of requisite infrastructure, human resources and supplies in target facilities as per the level of care) based on a quarterly assessment of health facilities
3. Cause-specific neonatal and young infant mortality rate based on verbal autopsies of all deaths among enrolled infants in the first 60 days
4. Documentation of the evolution of model development over time at each cycle

Completion date
30/06/2025

Eligibility

Key inclusion criteria
All 0-59 day old infants born to usual residents in the study area

Healthy volunteers allowed
No

Age group
Child

Lower age limit
0 Days

Upper age limit
59 Days

Sex
All

Total final enrolment
3813

Key exclusion criteria
Does not meet the inclusion criteria

Date of first enrolment
02/05/2023

Date of final enrolment
31/01/2025

Locations

Countries of recruitment
India

Study participating centre
Shivrajpur - Kanpur Nagar - UP
Block Shivrajpur
District Kanpur Nagar
Uttar Pradesh
Kanpur Nagar
India
209205

Sponsor information

Organisation
World Health Organization, Geneva

Funder(s)

Funder type

Charity

Funder Name
Bill and Melinda Gates Foundation

Alternative Name(s)
Bill & Melinda Gates Foundation, Gates Foundation, Gates Learning Foundation, William H. Gates Foundation, BMGF, B&MGF, GF

Funding Body Type
Government organisation

Funding Body Subtype
Trusts, charities, foundations (both public and private)

Location
United States of America

Results and Publications

Individual participant data (IPD) sharing plan
The datasets (de-identified individual-level data) generated during the current study will be available upon request from Aarti Kumar (aarti.kumar@celworld.org)

The type of data that will be shared: De-identified data that follow HIPAA compliance and Indian data protection rules
Timing for availability: At least 3 months after the completion of the study but available on the request
Whether consent from participants was required and obtained: Yes, consent will be taken from each of the participants
Comments on data anonymization:
Qualitative research data will include audio recordings of in-depth interviews (IDIs) and focus group discussions (FGDs); their transcriptions and any other profile or background information captured of the participants; and photo/video documentation of the observations (where consent is granted) along with detailed notes of observed activities and other background information on the family. Audio recordings of IDIs and FGDs will be assigned a unique case identifier and backed up on a secure and password-protected database accessible only to authorized research team members for transcription and erased from the recording device. The digital recording of interviews, focus group discussions, etc. will be transcribed verbatim in the language of data collection. All transcripts will be anonymized to ensure the privacy and confidentiality of participants. The audio recordings will be subsequently verified by a senior researcher to finalize the analytical datasets and will be completely destroyed at the end of the study. Photo/videography of observation sessions will be assigned unique case IDs, tagged based on activities, and preserved in a secure and password-protected database accessible only to select members of the research team for future analysis and/ or publication as per the consent granted by the participant. Detailed observation notes will be assigned a unique case id, anonymized and stored in a secure and password-protected database for further analysis by authorized research team members.

Data for the concurrent evaluation will be collected on Android-based tablet devices. The data tablet devices will be secured through device management software which allows for remote management through a central system. The device management system protects the data on the tablet devices and does not allow unauthorized apps to be installed on the device or any other application to be installed or delete the data on it. A data monitoring module will have features such as producing data outputs for regular data quality checks, generation of the visit schedules and data completeness checks. The study forms will have built-in checks for missing values, inconsistencies and skip logic. The collected data will be synchronized in real-time (or upon the availability of the network) to the cloud server. Data will also be backed-up on a daily basis on an in-house encrypted MySQL database, as well as an encrypted MySQL database on a cloud server located in India.
The entire data management system will be GCP compliant and will protect participant data in every aspect of data management from data collection to data analysis. Protecting the confidentiality of the data will be a high priority. The following safety measures will be employed to ensure data protection and safe handling. At the time of registration of birth, each young infant will be given a unique identification number. Data will be linked to participant identification numbers, and the table linking the identifier to identifying information will be stored in a separate encrypted database which will only be accessible to the data management steward during the course of the study. The consent form and any other physical forms linking participant personal information to the study ID code number will be kept in securely locked filing cabinets. Proper documentation and storage of the metadata and any files or protocols relevant to data management will be handled with utmost care. Regular backups of the existing data will be done at appropriate intervals. All computers being used in the study will be password protected and will have restricted access to specific study staff to protect confidentiality. None of the participants' names or identifiers will be used in any publications or discussions regarding the study. Data will be accessible only to authorized research team members.
The analytical datasets will be created from the de-identified raw data by merging various tables, as required, into a flat database. The raw data and consent forms will be stored for 7 years and subsequently destroyed. The table linking the participant identifiers with the identifying information will be maintained indefinitely by the data management steward under direct supervision by the principal investigator, to allow for future follow-up studies, if needed.
The call-centre solution will store the programmatic data of beneficiaries as well as providers, tracking each case of reported illness with the facilitation of care until recovery. It will have a robust, secure and encrypted database backend to ensure confidentiality. All analysis will be performed on de-identified data.
Any ethical or legal restrictions: The data can't be stored out of the country as per Indian government law and can be shared with de-identified data with collaborators as per plan or request.

IPD sharing plan summary

Available on request

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Participant information sheet	Evaluation Survey, Mothers-Caregivers version 1.0	08/08/2022	10/11/2022	No	Yes
Participant information sheet	FGD, FR, Mothers-Caregivers version 1.1	01/10/2022	10/11/2022	No	Yes

Participant information sheet	Health Workers/Providers (FGD) version 1.1	01/10 /2022	10/11 /2022	No	Yes
Participant information sheet	IDI, FR, Community Health Workers version 1.0	08/08 /2022	10/11 /2022	No	Yes
Participant information sheet	IDI, FR, Health Care Providers version 1.0	08/08 /2022	10/11 /2022	No	Yes
Participant information sheet	IDI, FR, Mothers-Caregivers version 1.0	08/08 /2022	10/11 /2022	No	Yes
Participant information sheet	IDI, FR, Program Managers, Policy Makers, Administrators version 1.0	08/08 /2022	10/11 /2022	No	Yes
Participant information sheet	Observations, FR, CHWs, HCPs version 1.0	08/08 /2022	10/11 /2022	No	Yes
Participant information sheet	Observations, FR, Mothers-Caregivers version 1.0	08/08 /2022	10/11 /2022	No	Yes
Participant information sheet	Verbal Autopsy, Mothers version 1.0	08/08 /2022	10/11 /2022	No	Yes
Protocol file	version 3.1	01/10 /2022	10/11 /2022	No	No
Protocol file	version 3.2	13/01 /2023	09/01 /2024	No	No