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Feasibility of Integrated Facility Cost Assessment and Patient Experience Evaluation for Outpatient Services at a Rural Community Health Centre: A Single-Site Pilot Study from North Karnataka, India

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Abstract

Background

Comprehensive assessment of outpatient department (OPD) services through patient-experience surveys and treatment-cost analyses is often impractical in resource-constrained rural public health facilities. This pilot study evaluated the feasibility of a low-resource approach combining routine facility-recorded treatment cost assessment with brief structured patient interviews before undertaking a definitive study.

Methods

This single-site, non-randomized pilot feasibility study was conducted at the Community Health Centre (CHC), Shirahatti, Karnataka, during two field visits in February 2025. Feasibility was assessed by evaluating extraction of treatment cost data from routine hospital records, acceptability of a structured 10-item patient-experience interview, and the usefulness of preliminary descriptive findings for planning a future study. Facility-recorded treatment cost data included 827 outpatient cases across communicable diseases, non-communicable diseases (NCDs), and obstetric and gynaecological (OBG) services. Twenty beneficiaries were approached, 12 consented, and five completed the interview.

Results

Aggregate treatment cost data were successfully extracted without disrupting routine clinical services; however, patient-level itemized cost data were unavailable. The average recorded treatment cost per case was ₹1,125.10 for NCDs, ₹1,705.15 for communicable diseases, and ₹3,494.32 for OBG services, with an overall average of ₹2,554 across 827 cases (total recorded treatment expenditure: ₹2,112,300). All completed interviews were conducted within the planned timeframe without missing responses, demonstrating the feasibility and acceptability of the interview process. The pilot also identified the need for patient-level cost data, probability-based sampling, and prospective documentation of recruitment metrics.

Conclusions

A combined review of routine facility-recorded treatment costs and brief patient-experience interviews was operationally feasible, acceptable, and practical for implementation as a low-resource approach for evaluating outpatient services at a rural Community Health Centre. The pilot supports progression to a definitive multicentre study with methodological refinements.

Trial registration:

Not applicable (non-randomized, non-interventional pilot feasibility study).

Background

Efficient outpatient services require evaluation from both economic and patient-centred perspectives to support evidence-informed improvements in healthcare delivery. However, comprehensive assessments that integrate facility cost information with patient experience are difficult to implement in resource-constrained public health settings because conventional costing studies and validated patient-experience surveys require substantial time, trained personnel, and financial resources. Consequently, practical, low-resource approaches are needed for routine evaluation of outpatient services, particularly in rural healthcare facilities.

Outpatient departments (OPDs) are often the first—and frequently the only—point of contact between rural communities and the public health system in India. Assessing both treatment costs and patient experience is essential for understanding healthcare quality, efficiency, and service responsiveness. Although robust methods such as bottom-up micro-costing and validated patient-experience instruments (e.g., SERVQUAL) are considered the standard for such evaluations, they are rarely feasible within the operational constraints of a single rural health facility or an academic field placement [1].

Pilot and feasibility studies provide an important preliminary step before undertaking a definitive investigation. Their purpose is to determine whether proposed methods, data sources, instruments, and operational procedures are feasible and acceptable in the intended setting, while identifying methodological refinements required for a future full-scale study rather than estimating population parameters or intervention effects [2, 3].

Accordingly, we conducted a single-site, mixed-methods pilot feasibility study at Community Health Centre (CHC), Shirahatti, Karnataka, as part of an MPH field practicum. The study combined a review of routine facility-recorded outpatient treatment costs with brief structured patient interviews to evaluate the feasibility, acceptability, and operational practicality of this low-resource assessment approach. The findings were intended to inform the design of a future adequately powered multicentre study.

Objectives

- To evaluate the process feasibility of extracting routine facility-recorded outpatient treatment cost data for major clinical case groups without disrupting routine clinical operations.
- To assess the acceptability and operational feasibility of administering a brief structured patient-experience interview to outpatient beneficiaries during routine visits.
- To determine whether the combined cost-review and patient-interview approach could generate sufficient preliminary data to inform the design and methodological refinement of a future adequately powered multicentre study.

Methods

Study Design

This was a single-site, non-randomized, observational mixed-methods pilot feasibility study conducted to evaluate the feasibility and acceptability of integrating facility-recorded treatment cost assessment with patient-experience evaluation in a rural outpatient setting. The manuscript was prepared in accordance with the CONSORT Extension for Pilot and Feasibility Trials, where applicable, and the reporting recommendations for non-randomized pilot and feasibility studies [4].

Study Setting

The study was conducted at the Community Health Centre (CHC), Shirahatti, Gadag district, Karnataka, India, a secondary-level public healthcare facility serving an estimated catchment population of 80,000–120,000. The facility manages approximately 200–300 outpatient visits daily, with General Medicine and Obstetrics & Gynaecology (OBG) providing the major outpatient services, while patients requiring specialized care are referred to higher-level centres.

Study period

The pilot study was conducted during two field visits in February 2025: routine facility-recorded treatment cost data were extracted on 11 February 2025, followed by structured outpatient beneficiary interviews on 18 February 2025.

Predefined feasibility criteria

Before commencing the pilot, predefined operational criteria were established based on published recommendations for pilot and feasibility studies. Successful implementation was defined as: (i) retrieval of facility-recorded treatment cost data without disrupting routine clinical services; (ii) completion of at least 80% of planned patient interviews; (iii) interview completion within approximately 10 minutes; (iv) minimal missing data in completed questionnaires; and (v) generation of sufficient methodological information to refine the protocol for a future definitive study. These criteria were used to evaluate methodological feasibility rather than clinical or service effectiveness.

Feasibility was evaluated across four domains:

- **Process feasibility**: Retrieval of facility-recorded treatment cost data from routine hospital records and assessment of data completeness and accessibility.

- **Operational and resource feasibility**: Integration of data collection into routine outpatient services without disrupting workflow or requiring additional staff or resources.
- **Acceptability**: Willingness of outpatient beneficiaries to participate and successful completion of the structured interview.
- **Scientific feasibility**: Generation of preliminary descriptive data sufficient to inform the design, sampling strategy, and data-collection procedures for a future definitive study, without drawing population-level inferences.

Participants and sampling

Cost data comprised aggregate, de-identified case counts and treatment costs extracted from routine hospital records for communicable diseases, non-communicable diseases, and obstetric and gynaecological conditions (827 recorded outpatient cases). Patient interviews used a pragmatic convenience sample. Twenty beneficiaries were approached, of whom 12 provided consent. Owing to the limited duration of the field practicum, interviews were completed with the five participants planned for this pilot.

The interview component intentionally involved a small pragmatic sample because the primary objective was to evaluate the feasibility and acceptability of the interview procedures rather than to estimate patient-experience outcomes. All five planned interviews were completed without missing responses or disruption to routine outpatient services, demonstrating the operational feasibility of the data-collection process.

Data collection

1. Facility-recorded treatment cost assessment

Aggregate, de-identified outpatient treatment cost data were extracted from routine hospital records for six communicable diseases, four non-communicable diseases, and five obstetric and gynaecological (OBG) case categories. Information collected included the number of outpatient cases, average recorded treatment cost per case, and total recorded treatment expenditure for each disease category. Data extraction was performed in consultation with hospital staff without interrupting routine outpatient services.

2. Patient-experience assessment

A structured ten-item interviewer-administered questionnaire was developed following a review of published patient-experience instruments used in outpatient settings in India and other South Asian countries. The questionnaire covered key domains of outpatient service delivery, including accessibility, waiting time, communication, staff behaviour, cleanliness, availability of medicines, perceived quality of care, financial burden, and suggestions for improvement [14]. The instrument underwent expert review for face validity and was pre-tested among outpatient beneficiaries to ensure clarity and contextual

appropriateness. Interviews were conducted face-to-face in the local language after obtaining informed consent.

Statistical Analysis

Facility-recorded treatment cost data were summarized using descriptive statistics, including case counts, average recorded treatment costs, and total recorded treatment expenditure by disease group. Patient-experience data were summarized descriptively to illustrate the range of responses across interview domains. No inferential statistical analyses were performed because the primary objective was to evaluate methodological feasibility rather than estimate population parameters or intervention effects. Feasibility outcomes were interpreted against the predefined progression criteria.

Ethics

The study was approved by the Institutional Ethics Committee (IEC), Ref. No. RDPRU/SEP/04/MPH/2024/35 and administrative permission was obtained from the Community Health Centre, Shirahatti. Verbal informed consent was obtained from all interview participants before data collection. No personally identifiable information was collected, and all participant data were anonymised prior to analysis.

Results

1. Process feasibility: Facility-recorded treatment cost assessment

Aggregate, de-identified outpatient treatment cost data were successfully extracted from routine hospital registers during a single field visit without disrupting routine outpatient services or requiring additional staff time. Cost information was available for communicable diseases, non-communicable diseases (NCDs), and obstetric and gynaecological (OBG) services, comprising 827 recorded outpatient cases (Tables 1–3). However, the registers contained only aggregate case-group data; patient-level itemized treatment costs (e.g., consultation, investigations, and medicines) were not routinely available. This identified an important methodological limitation and indicates that a future definitive costing study will require prospective patient-level data collection or access to detailed billing records.

Table 1
Facility-recorded outpatient treatment costs for communicable diseases (n = 97)

Disease	No. of cases	Average cost/case (Rs.)	Total cost (Rs.)
Pulmonary tuberculosis	67	2,000	1,34,000
Typhoid	9	800	7,200
Mumps	7	300	2,100
Dog bite (post-exposure care)	5	800	4,000
Leprosy	2	300	600
Dengue	7	2,500	17,500
Total	97	1,705.15 (avg.)	1,65,400

Table 2
Facility-recorded outpatient treatment costs for non-communicable diseases (n = 255)

Condition	No. of cases	Average cost/case (Rs.)	Total cost (Rs.)
Diabetes mellitus	112	1,500	1,68,000
Hypertension	73	800	58,400
Asthma	39	1,000	39,000
Mental health (general)	31	700	21,700
Total	255	1,125.10 (avg.)	2,87,100

Table 3
Facility-recorded outpatient treatment costs for obstetric and gynaecological services (n = 475)

Service/condition	No. of cases	Average cost/case (Rs.)	Total cost (Rs.)
Antenatal checkups (ANC)	210	2,000	4,20,000
Postnatal checkups (PNC)	167	4,000	6,68,000
Normal vaginal delivery	57	5,000	2,85,000
Caesarean section	33	8,400	2,77,200
Medical termination of pregnancy (MTP)	8	1,200	9,600
Total	475	3,494.32 (avg.)	16,59,800

Across the three service groups, 827 recorded outpatient cases accounted for a total recorded treatment expenditure of ₹2,112,300, corresponding to an average recorded treatment cost of ₹2,554 per case. OBG services had the highest average recorded treatment cost per case (₹3,494.32), followed by

communicable diseases (₹1,705.15), while NCDs had the lowest average cost (₹1,125.10). Within the communicable disease group, pulmonary tuberculosis accounted for the greatest proportion of both outpatient cases and recorded treatment expenditure. These findings represent routine facility-recorded treatment costs and are intended only as preliminary descriptive information to assess the feasibility of the costing approach and inform the design of a future definitive study. They should not be interpreted as validated economic cost estimates derived from a patient-level micro-costing analysis.

2. Acceptability and operational feasibility of the patient-experience interview

Twenty beneficiaries were approached, and 12 consented to participate. Owing to time constraints during the field practicum, the five interviews planned for this pilot were completed. All completed interviews contained no missing responses and were conducted without interrupting routine outpatient services.

The interview schedule captured variation across all assessed domains, including overall quality of care, timeliness, staff behaviour, cleanliness, availability of medicines, accessibility, and financial burden (Table 4). These findings suggest that the instrument was capable of capturing diverse patient experiences and is suitable for refinement and evaluation in a larger definitive study. However, recruitment refusal rates and interview duration were not prospectively documented, representing procedural limitations that should be addressed in future studies.

Table 4
Summary of patient-experience findings from structured interviews (n = 5)

Domain	Summary of findings
Overall quality of care	Ratings ranged from poor to excellent.
Timeliness	Waiting times varied from approximately 10 minutes to over 3 hours.
Staff behaviour	Experiences ranged from courteous and supportive to poor communication.
Cleanliness	Perceptions ranged from clean and hygienic to concerns regarding sanitation.
Availability of medicines/equipment	Most participants reported adequate availability; one purchased medicines externally.
Accessibility	Good access for nearby residents; transport difficulties were reported by some rural beneficiaries.
Financial burden	Most perceived treatment costs as free or affordable; one participant reported additional out-of-pocket expenditure.
Suggestions for improvement	Participants recommended reducing waiting times, improving cleanliness, strengthening communication, and ensuring medicine availability.

3. Resource and management feasibility

Facility-record review and patient interviews were completed during two field visits by a small practicum team using existing hospital resources, without requiring additional staff or interrupting routine outpatient services. These findings demonstrate that the combined assessment approach is operationally feasible and can be implemented in similar rural public health facilities with minimal additional resources.

4. Overall feasibility outcomes and progression criteria

The pilot findings were evaluated against the predefined feasibility criteria. Overall feasibility outcomes and progression decisions are summarized in Table 5.

Feasibility domain	Prespecified success criterion	Pilot finding	Progression decision
Process feasibility	Retrieval of routine facility-recorded treatment cost data without disrupting OPD services	Aggregate treatment cost data for 827 outpatient cases were successfully retrieved during a single field visit; patient-level itemised cost data were unavailable.	**Proceed with modification** (prospective patient-level cost data collection required)
Acceptability	Completion of the planned patient interviews with minimal missing data and acceptable participant cooperation	Twenty beneficiaries were approached, 12 consented, and all five planned interviews were completed successfully with no missing responses or disruption to routine outpatient services.	**Proceed**
Operational feasibility	Data collection completed without interrupting routine OPD workflow	Register review and interviews were completed during two field visits without disrupting routine outpatient services.	**Proceed**
Resource feasibility	Data collection feasible using existing personnel and available resources	Data collection was completed by the practicum team using routine facility resources without additional staffing or infrastructure.	**Proceed**
Data completeness	Minimal missing information in completed questionnaires	All completed interview questionnaires contained complete responses.	**Proceed**
Recruitment monitoring	Prospective documentation of recruitment, consent, refusal, and interview duration	Numbers approached and consented were recorded; refusal and interview-duration data were not prospectively documented.	**Proceed with modification**
Scientific feasibility	Generation of sufficient information to refine the definitive study protocol	Preliminary treatment-cost patterns and patient-experience findings were adequate to identify methodological refinements for a future definitive study.	**Proceed**

Overall, the pilot met all predefined feasibility criteria except prospective documentation of recruitment and interview-duration metrics, which were identified as protocol refinements for the definitive study.

Discussion

This pilot demonstrated that a combined review of routine facility-recorded treatment costs and brief patient-experience interviews is operationally feasible and acceptable as a low-resource approach for evaluating outpatient services in a rural Community Health Centre. Aggregate treatment cost data were

successfully extracted from routine hospital registers without disrupting routine outpatient services, and the structured interview was completed with no missing responses among the planned participants. These findings support the feasibility of implementing this combined methodology using existing facility resources. This is consistent with published guidance on pilot and feasibility studies, which emphasizes evaluating study processes, resource requirements, management, acceptability, and preliminary scientific outcomes rather than estimating population parameters or intervention effects. Reporting feasibility findings, irrespective of their outcome, also contributes to improving the design of future definitive studies [1–4].

Although not intended to provide definitive estimates, the descriptive findings provided useful preliminary information for planning a future definitive study. Routine hospital records indicated higher recorded treatment costs for obstetric and gynaecological services than for non-communicable disease care, while the structured interview captured variation in waiting time, staff behaviour, cleanliness, medicine availability, accessibility, and financial burden. Similar determinants of patient experience have been reported in larger outpatient studies from India and neighbouring countries, where waiting time, provider communication, and facility infrastructure consistently influence patient satisfaction [5–9]. However, because this pilot included only five completed interviews, these findings should be interpreted solely as preliminary descriptive observations rather than estimates of patient experience. Nevertheless, the consistency of the response patterns with previous literature provides reassuring evidence of the interview instrument's face validity and supports its practical utility for use in a larger, adequately powered study.

The findings also support established quality-of-care frameworks, which recognize that health-system performance depends not only on clinical care but also on the organization and responsiveness of service delivery. Consistent with the Donabedian model, process-related factors such as waiting time, staff behaviour, communication, and cleanliness emerged as the principal issues reported by participants, highlighting the importance of evaluating both service quality and resource utilization when assessing outpatient care [13, 14].

The principal methodological lesson from this pilot was that routinely maintained hospital registers contained only aggregate treatment cost information and were inadequate for patient-level costing. Consequently, a definitive economic evaluation will require prospective collection of patient-level resource utilization data or access to itemized billing records, consistent with established methods for health economic evaluation and health technology assessment, which recommend prospective collection of patient-level resource utilization data for valid unit-cost estimation and economic evaluation [10, 11]. The pilot also identified several protocol refinements, including probability-based sampling across a complete working week, systematic documentation of recruitment and refusal metrics, use of a validated patient-experience instrument, and recruitment of an adequately powered sample. These modifications are expected to strengthen methodological rigor and improve the validity and transferability of findings from the definitive multicentre study.

Lessons learned

This pilot demonstrated that routine facility registers can support preliminary assessment of outpatient treatment costs but are insufficient for patient-level economic evaluation. It also showed that brief structured patient interviews can be implemented without disrupting routine outpatient services, while highlighting the importance of prospectively documenting recruitment metrics and using probability-based sampling in future studies

Progression to a definitive study

Overall, the pilot met its primary methodological objectives and supports progression to a definitive multicentre study with methodological refinements. These include obtaining access to patient-level treatment cost data, implementing probability-based sampling across a full working week, prospectively documenting recruitment, refusal, and interview-duration metrics, using a validated patient-experience instrument, and recruiting an adequately powered sample. Collectively, these refinements are expected to strengthen methodological rigor, improve data quality, and enhance the external validity of findings from the definitive study.

Strengths and limitations

Strengths

- Evaluated the feasibility of a combined facility-recorded cost assessment and structured patient-experience interview under routine conditions in a rural public health facility.
- Used routinely available facility data and a pragmatic, low-resource approach without disrupting outpatient services or requiring additional staffing.
- Transparently identified methodological challenges and protocol refinements to inform the design of a future definitive multicentre study.

Limitations

- The interview component included only five completed interviews from a pragmatic convenience sample; therefore, patient-experience findings are preliminary and not intended to be representative.
- Recruitment, refusal, and interview-duration metrics were not prospectively documented, limiting assessment of recruitment feasibility.
- Cost data were available only as aggregate facility-recorded estimates; patient-level resource utilization and itemized costing were not available.
- Data collection was conducted over two field visits at a single rural health facility, limiting assessment of temporal variation and transferability of feasibility findings to other settings.

Conclusion

A combined routine facility-cost review and brief structured patient-interview approach was operationally feasible, acceptable, and practical for conducting a low-resource assessment of outpatient services at a rural Community Health Centre in Karnataka. The pilot demonstrated the feasibility of integrating facility-recorded cost data with patient-experience assessment while identifying key methodological refinements for a definitive study. These include obtaining patient-level cost data, implementing probability-based sampling, prospectively documenting recruitment and refusal metrics, and using a larger sample with a validated patient-experience instrument. The findings provide a foundation for a future multicentre study evaluating outpatient service costs and patient experience.

Abbreviations

Abbreviation	Definition
ANC	Antenatal check-up
CHC	Community Health Centre
IEC	Institutional Ethics Committee
MPH	Master of Public Health
MTP	Medical Termination of Pregnancy
NCD	Non-Communicable Disease
OBG	Obstetrics and Gynaecology
OPD	Outpatient Department
PNC	Postnatal Check-up

Declarations

Ethics approval and consent to participate

This study was approved by the Institutional Ethics Committee (IEC) (Ref. No. RDPRU/SEP/04/MPH/2024/35). Permission to conduct the study was obtained from the administrative authorities of Community Health Centre, Shirahatti. Verbal informed consent was obtained from all participants prior to the interviews. No personally identifiable information was collected.

Consent for publication:

Not applicable - no individual patient data, images, or identifying details are included in this report; beneficiaries are referred to only by anonymised labels.

Competing interests:

The authors declare that they have no competing interests.

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Author Contribution

AK conceived and designed the study, analyzed the data, interpreted the findings, and drafted the manuscript. GD collected and analyzed the data, contributed to study supervision, critically revised the manuscript for important intellectual content, and approved the final version. All authors read and approved the final manuscript.

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Data Availability

Availability of data and materials: The de-identified datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request.

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Figures

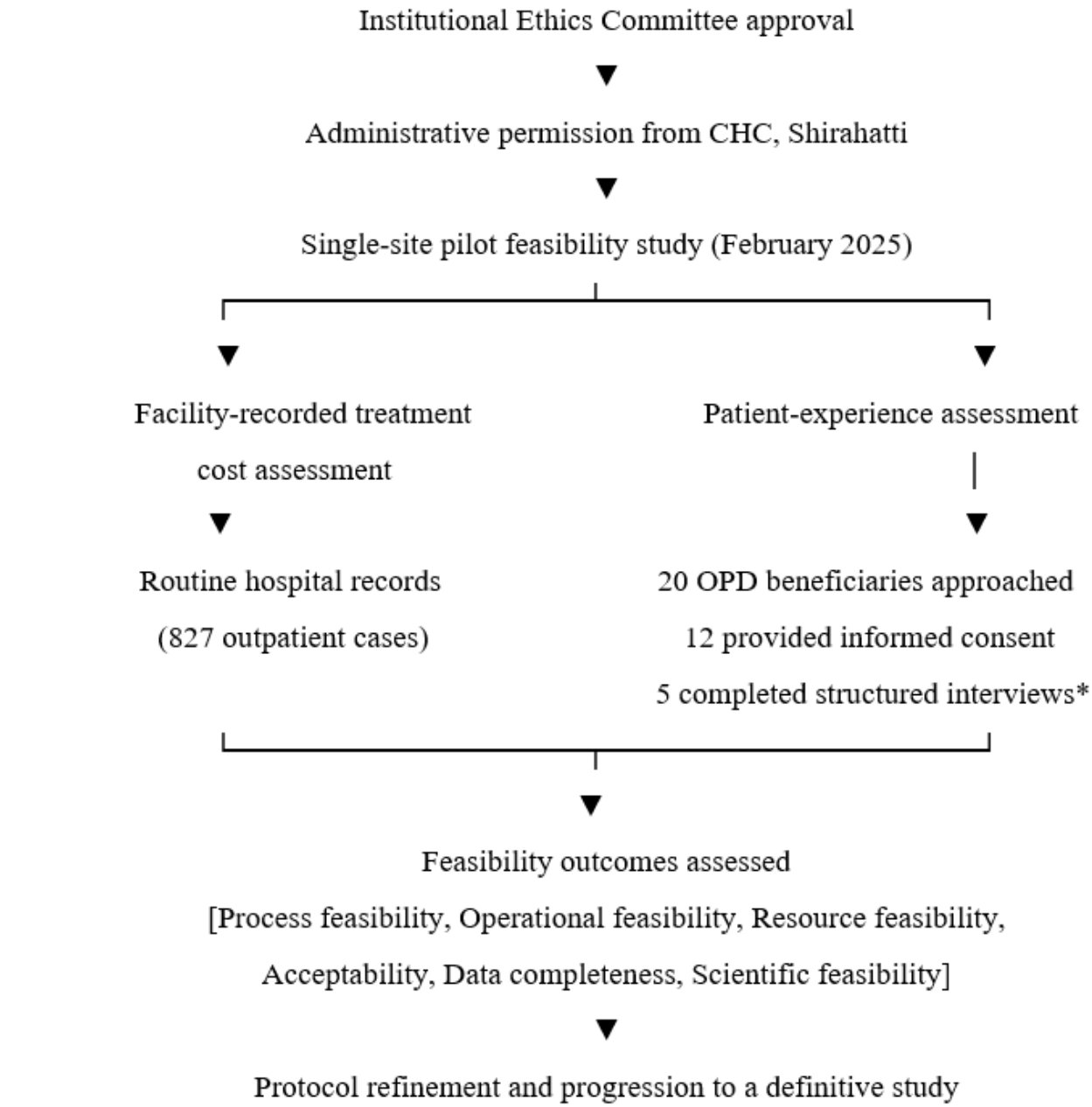


Figure 1

Flow diagram of the pilot feasibility study

Supplementary Files

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