Assessing the Landscape of Economic Evaluations in Health Interventions: A Critical Examination and Recommendations for Bangladesh

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Abstract

Abstract

Effective resource allocation in the healthcare sector necessitates comprehensive economic evaluations. Despite numerous health intervention studies in Bangladesh, there is a dearth of systematic reviews assessing their economic impacts. This study aims to fill this gap by conducting a thorough review of peer-reviewed articles on economic evaluations of health interventions in Bangladesh. A systematic literature search was conducted in January 2024 using a combination of keywords, Economic Evaluations, Health Interventions in Bangladesh. The search strategy targeted articles indexed in Scopus indexed and Google Scholar. The review focused on mapping the areas of economic evaluation explored in the articles and assessing their methodological quality using established criteria. Results: Out of 2750 potential articles, only 30 met the inclusion criteria. The majority of studies inadequately described competing alternatives and failed to clarify their perspectives. Direct costs were consistently included, but community-donated resources and volunteer costs were rarely accounted for. Only a fraction of studies calculated incremental cost-effectiveness ratios, and sensitivity analyses were infrequently applied. Discussions on financial affordability and generalizability were limited across the studies. The limited number of economic evaluation studies in Bangladesh across various health intervention domains undermines the depth of knowledge in this area. Cost-effectiveness analysis emerged as the most commonly applied method, yet many studies lacked methodological rigor. Strengthening capacity in economic evaluation of health programs is imperative to inform evidence-based decision-making in resource allocation.

Keywords:

Economic evaluations, Health economics, Bangladesh, Resource allocation, Intervention effectiveness, Cost analysis, Decision-making.

1. Background

Resource scarcity is a significant challenge for healthcare systems in low-income countries, where limited financial and material resources must be carefully managed to maximize health outcomes. Efficient resource allocation is crucial in these settings, and economic evaluation has emerged as a vital tool in prioritizing health interventions based on their cost-effectiveness. This method allows policymakers to assess the value of various healthcare interventions, ensuring that the limited resources available are used in the most impactful way possible (Hoffman et al., 2000).

In Bangladesh, the use of economic evaluation in healthcare policymaking has been inconsistent, despite its recognized potential to enhance decision-making. Policymakers often debate the feasibility and value of integrating economic evidence into the process of setting healthcare priorities. Challenges such as varying levels of awareness and expertise in economic evaluation, along with differing perspectives on its importance, contribute to this inconsistency (Kumar et al., 2020). These debates reflect broader concerns about the capacity of local health systems to effectively utilize such tools, as well as the readiness of policymakers to embrace evidence-based decision-making practices (Rojas-Roque & Palacios, 2023).

Globally, economic evaluation research has been extensively reviewed, providing valuable insights into its application across different healthcare systems. However, there is a noticeable gap in country-specific studies, particularly in low-income settings like Bangladesh. This gap highlights the need for more localized research that can address specific challenges and opportunities within these contexts. Previous reviews have identified several barriers to the effective use of economic evaluation in such settings, including limited local expertise, inadequate training, and insufficient quality monitoring mechanisms (Ranjbari et al., 2022).

To fill this gap, our study systematically reviews existing economic evaluation studies in Bangladesh, aiming to provide a comprehensive overview of the current landscape. We categorize the interventions evaluated in these studies and assess their methodological quality using the checklist developed by Furlan et al. (2022). This checklist is a standardized tool that evaluates various aspects of economic evaluations, including study design, data sources, and analysis methods, ensuring a consistent and rigorous assessment of quality.

The findings from this review will offer critical insights into the state of economic evaluation research in Bangladesh, highlighting both the strengths and areas for improvement. By identifying trends and gaps in the existing literature, we aim to inform recommendations for enhancing the impact of economic evaluation on healthcare policy. This includes suggestions for capacity-building initiatives, such as training programs for local researchers and policymakers, as

well as the development of more robust monitoring and evaluation systems.

In overall, while economic evaluation holds significant promise for improving healthcare resource allocation in low-income countries, its effective implementation remains a challenge. This study aims to contribute to the ongoing discourse by providing a detailed analysis of the current use of economic evaluation in Bangladesh. By fostering a deeper understanding of the local context and identifying key areas for improvement, we hope to support more informed and efficient decision-making in healthcare, ultimately leading to better health outcomes for the population.

2. Methods

2.1 Search Strategy:

A comprehensive search strategy was devised to explore relevant literature indexed in Scopius. The search encompassed publications indexed till 31st January 2024. The search employed a combination of keywords, economic evaluation, health intervention in Bangladesh. Furthermore, Google Scholar was utilized to broaden the search scope. To ensure comprehensiveness, manual searches of reference lists from identified papers and relevant reviews were performed.

2.2 Inclusion Criteria:

This research synthesized economic evaluations of health-related interventions in Bangladesh using published studies. Both primary and secondary data were considered, and studies were limited to English publications involving human participants.

2.3 Exclusion Criteria:

Studies not conducted on humans, unrelated to the health sector or Bangladesh, were excluded from our analysis. Additionally, studies lacking any cost-related data or classified as editorial, review, or methodological articles were excluded.

2.4 Results:

The Results section comprises three parts: the search process outcomes, a mapping of economic evaluation studies, and an assessment of article methodologies. The mapping aimed to pinpoint areas of economic evaluation research. The methodological assessment focused on evaluating study adherence to economic evaluation standards.

2.4.1 Search Results

A total of 2750 abstracts were identified in January 2024. After initial screening by two independent reviewers, 2682 were excluded. Of the remaining 68 full-text articles, 30 were deemed eligible following a second round of review. Data was extracted from these 30 articles. Figure 1 illustrates the flowchart depicting the study selection process.

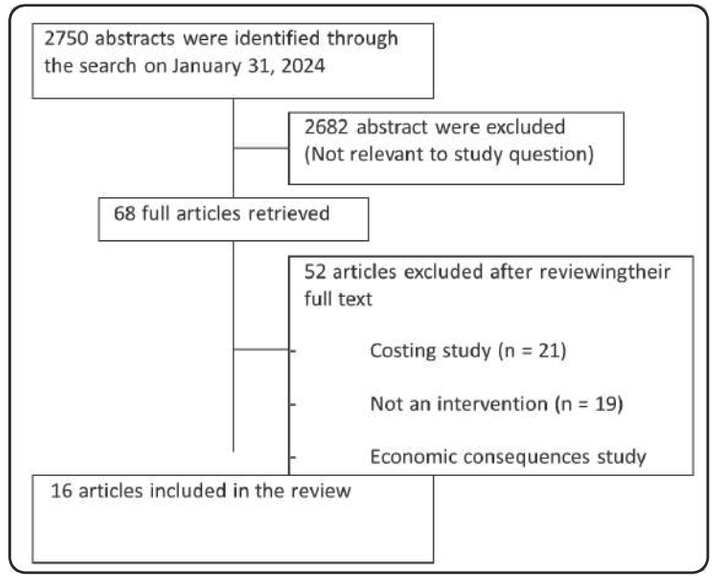


Figure 1 Flowchart of study selection process.

2.4.2 Mapping the Articles

The landscape of articles focusing on the economic evaluation of healthcare programs in Bangladesh, as published in international journals, displays significant limitations and a high degree of variability. These variations include the dates of publication, the subjects evaluated, and the evaluation methods used. Over the past forty years, only 30 articles have been published, indicating a slow but steady increase in the number of studies. Specifically, one article appeared in the 1980s, increasing to four in the 1990s and seven since 2000. Additional file 4 provides a detailed summary of all reviewed articles, including information on authors' affiliations, collaborators, funding sources, and the types of economic evaluations conducted, presented in a matrix format.

Economic evaluations of health interventions in Bangladesh have been limited despite a gradual increase in publications. Since the first study in 1983, the number of articles remains relatively small. Most research involved collaborations between local and international institutions.

Research topics vary widely, including disease-specific interventions like diarrhea, tuberculosis, and vaccinations, as well as broader programs focused on family planning, maternal health, and community education.

Funding primarily came from international organizations such as the Bill & Melinda Gates Foundation, World Bank, and Save the Children. Limited support was received from domestic sources like BRAC.

Cost-effectiveness analysis was the most common evaluation method used, with fewer studies employing cost-minimization and cost-utility analysis.

3 Technical Characteristics

The methodological quality of the sixteen included economic evaluations was assessed using a checklist adapted from Evers et al. (2005). Table 1 summarizes the adherence of these studies to reporting guidelines for economic evaluations. This table provides a detailed overview of the methodological assessment criteria employed to evaluate the quality and comprehensiveness of economic evaluations conducted in Bangladesh.

Table 1 Methodological Assessment of Economic Evaluations in Bangladesh

Description of Competitive Alternatives: Most studies (10 out of 12) provided a clear description of competitive alternatives, which is crucial for understanding the context and scope of the economic analysis.
Well-defined Questions: All 12 studies presented well-defined research questions, ensuring that the objectives were clear and answerable.
Appropriate Study Design: Eleven studies used appropriate economic evaluation designs, indicating robust methodological approaches in most cases.
Time Horizon: All studies included a defined time horizon, which is essential for capturing the long-term impacts and costs.
Perspective: Eleven studies clearly stated the perspective of the analysis, an important factor in determining the costs and benefits included.
Comprehensive Cost Inclusion: Nine studies included all relevant cost items, ensuring a thorough assessment of economic impact, though three did not, which could lead to incomplete evaluations.
Cost Measurement and Valuation: Nine studies appropriately measured and valued costs, while three failed to do so, potentially compromising the accuracy of the cost assessments.
Base Year of Cost Data: Nine studies stated the base year for cost data, which is important for consistency and comparability over time.
Sources of Cost and Outcome Data: Most studies (11 for cost data, 9 for outcome data) provided sources, ensuring transparency and reliability in data reporting.

Incremental Cost -Effectiveness Ratio (ICER): Only 2 studies calculated the ICER, a key measure in economic evaluations that compares the cost effectiveness of different interventions.
Discounting of Costs and Outcomes: Few studies (3 for costs, 2 for outcomes) applied discounting, a technique that accounts for the time value of money, which is essential in long-term analyses.
Sensitivity Analysis: Six studies conducted sensitivity analyses to test the robustness of their results, which is crucial for understanding the reliability of the findings.
Conclusions: All studies drew conclusions that followed logically from the reported data, ensuring that the interpretations were supported by the evidence.
Generalisability: Only 3 studies discussed the generalizability of their findings, indicating a need for broader consideration of the applicability of results beyond the study context.
Ethical and Affordability Considerations: Ethical issues were discussed in four studies, and affordability was considered in only one, highlighting areas for improvement in comprehensive economic evaluations.

Overall, while many studies demonstrated strong methodological rigor, there are areas, such as sensitivity analysis, ethical considerations, and discounting, where improvements are needed to enhance the robustness and applicability of economic evaluations in Bangladesh.

3.1 Description of Competing Alternatives:

In ten studies, the competing alternatives were clearly defined. However, in two studies, the alternatives were not explicitly outlined, despite comparisons being made between programs and a "do-nothing" scenario. In economic evaluations of health interventions, it is essential to describe the competing alternatives to provide a clear understanding of the relative costs and benefits associated with various healthcare strategies (References 18, 19, 20). These studies provided detailed descriptions of the different healthcare interventions or programs being compared. For example, they might have compared the cost-effectiveness of two different treatment approaches for a particular disease, or assessed the economic impact of implementing a specific health intervention versus maintaining the status quo. In two studies, while explicit descriptions of competing alternatives were lacking, the comparison was made implicitly. These studies compared the economic implications of implementing a healthcare program with doing nothing (i.e., maintaining the current situation or standard practice). Although the alternatives were not explicitly stated, the comparison with a "do-nothing" scenario implied the existence of

competing alternatives. For future research, it's essential for studies to explicitly outline the competing alternatives being considered in economic evaluations. This clarity ensures transparency in the analysis and facilitates a better understanding of the decision-making context. Additionally, researchers should strive to consider a range of alternatives, including both active interventions and the option of maintaining existing practices, to provide policymakers with comprehensive information for informed decision-making.

3.2 Pose Study Question and Design Appropriately:

All studies formulated study questions in answerable form and designed the economic study appropriately. By formulating the study question in an answerable form and designing the economic study appropriately, researchers can ensure that the evaluation provides meaningful insights into the economic implications of the health intervention in Bangladesh, aiding decision-makers in resource allocation and policy planning (Reference number 14, 15, 16)

3.3 Consideration of Perspective:

Only two studies explicitly stated the perspective of their articles. However, upon review, the perspective of the studies could be inferred, although not explicitly mentioned. Some studies considered a societal perspective, incorporating various cost components such as personnel costs, capital costs, recurrent costs, training costs, and costs borne by patients. However, others adopted a provider's perspective. In this context, it's noted that while only two studies explicitly stated their perspective, the perspective of other studies could be inferred based on the cost components considered. Some studies incorporated a broad societal perspective, taking into account various cost components such as personnel costs, capital costs, recurrent costs, training costs, and costs borne by patients. On the other hand, other studies may have adopted a narrower provider's perspective, focusing primarily on costs directly incurred by healthcare providers without considering broader societal costs (Reference number 12, 21, 22). This observation underscores the importance of clearly stating the perspective adopted in economic analyses, as it can significantly impact the results and implications of the study.

3.4 Identification and Measurement of Costs:

The reviewed studies consistently accounted for direct costs incurred by healthcare providers. However, there were variations in the scope of costs included. Nine of the studies provided a comprehensive overview of major costs, while one study excluded administrative and logistic expenses, and another did not consider household and staff-related costs. Notably, only one study accounted for the value of community-donated resources and volunteer time. The ways in which costs were identified and measured in these studies showcased both commonalities and differences in their methodologies. This is a common starting point in economic analyses within

healthcare. Nine out of the reviewed articles provided a comprehensive coverage of major costs. This suggests that these studies took a broad approach to cost measurement, likely encompassing a wide range of cost components such as personnel expenses, equipment costs, facility expenses, and other direct expenditures related to the provision of healthcare services. However, there were variations among studies regarding the inclusion of specific cost components. One study did not include administrative and logistic costs (Reference number 23,24,25). This omission could potentially underestimate the total costs incurred by providers, as administrative and logistic expenses are integral to the functioning of healthcare delivery systems. Another study omitted household and staff costs. Neglecting these costs may underestimate the societal burden of the healthcare intervention, as it fails to account for the indirect costs borne by households and the healthcare workforce. Only one study included the costs of community-donated resources and volunteer time. This demonstrates a more comprehensive approach to cost measurement, acknowledging the value of resources contributed by the community and volunteer efforts in healthcare provision. Overall, while the inclusion of direct costs by providers was consistent across all studies, variations in the coverage of other cost components highlight the importance of transparency and comprehensiveness in cost identification and measurement methodologies. Such differences can significantly influence the accuracy and applicability of economic evaluations in healthcare decision-making processes.

3.5 Sources and Techniques of Data Collection:

In the reviewed articles, while all provided information on the sources of cost data, the descriptions of these sources and the data collection methods were often not clearly articulated. Various data collection techniques were utilized, including observation, interviews, record reviews, literature reviews, patient interviews or surveys, and price-list reviews. The diversity in data collection methods highlighted in these articles indicates a range of approaches, yet there is room for improvement in the clarity of reporting. This clarity is crucial for readers to understand the foundation of the cost estimates presented, as well as to assess the reliability and validity of these estimates. A lack of clear description can impede the reproducibility of studies and make it difficult for readers to evaluate the robustness of the findings (Reference number 26, 27, 28). Direct observation of healthcare processes and resource utilization. Conducting interviews with relevant stakeholders such as healthcare providers, administrators, or patients to gather information on costs and resource utilization. Reviewing existing records or databases containing cost and utilization data. Reviewing published reports or literature to gather cost data or estimates from similar studies. Collecting cost-related information directly from patients through interviews or surveys. Reviewing price lists or fee schedules to ascertain the costs of specific services or resources. Each data collection technique has its strengths and limitations,

and the choice of method may depend on factors such as the availability of data, the nature of the healthcare intervention being studied, and the research objectives. In summary, while the articles generally reported the sources of cost data, improvements in the clarity of descriptions and methodologies used for data collection could enhance the transparency and credibility of economic evaluations in healthcare research.

3.6 Measurement of Costs:

In the review, only two studies utilized the ingredient approach for allocating resources step-by-step. This method involves dissecting costs into individual components, or "ingredients," to allocate resources sequentially, thereby calculating the total cost of a program or intervention. This approach enhances the transparency and precision of cost estimation by providing a detailed view of cost drivers and resource utilization. Furthermore, nine studies employed discounting to adjust for the lifetime costs of capital and recurrent expenditures. Discounting is a standard practice in economic evaluations, used to bring future costs and benefits to their present value. This adjustment reflects the time value of money, acknowledging the preference for earlier benefits and the opportunity cost associated with capital over time. By discounting future costs, these studies aim to deliver a more accurate economic assessment of interventions or programs across their lifespan. These findings highlight the diversity in cost measurement methodologies across the reviewed studies. While the ingredient approach offers a detailed and systematic way of allocating resources, discounting for lifetime adjustment is crucial for accounting for the timing of costs and benefits. Both approaches contribute to the rigor and comprehensiveness of economic evaluations in healthcare research.

3.7 Measurement of Outcomes:

The reviewed studies predominantly utilized natural units to measure outcomes, with three studies specifically focusing on health outcomes. Two studies employed Quality-Adjusted Life Years (QALYs) as a metric, while one study used Disability-Adjusted Life Years (DALYs). The use of natural units generally refers to direct measures of the intervention's impact, such as the number of patients treated or clinical indicators like blood pressure. Health outcomes, on the other hand, assess changes in health status due to the intervention, providing critical insights into its effectiveness. QALYs combine the quantity and quality of life, facilitating comparisons across different healthcare interventions. DALYs measure the overall burden of disease by accounting for both premature mortality and disability. This variation in outcome measurement methods reflects the diverse aims and contexts of the economic evaluations conducted in these studies, offering a broader perspective on the interventions' effects on health and well-being.

3.8 Discounting

Several studies included discounting, with three studies discounting costs and two studies discounting outcomes. Two studies calculated the Incremental Cost-Effectiveness Ratio (ICER), comparing their findings to standard benchmark rates. To ensure the robustness of their results, six studies conducted sensitivity analyses, examining the impact of varying assumptions and input values. Affordability was considered in two studies, while four studies addressed the generalizability of their findings. However, most articles did not thoroughly address ethical and distributional concerns. Overall, although the methodological quality of economic evaluations varied, adherence to essential reporting guidelines was generally observed, underscoring the importance of consistency and transparency in future research.

4. Discussion

The review of economic evaluation studies on health interventions in Bangladesh highlights several significant issues and limitations within the current research landscape. Although there has been an increase in publications in this area, the scope remains limited, with no single area or type of intervention being comprehensively explored. Research in this field often involves collaboration with international institutions, where Bangladeshi researchers typically participate as collaborators rather than leading the studies.

Cost-effectiveness analysis (CEA) is the most common form of economic evaluation in these studies, likely due to the accessibility of effectiveness data and the relatively straightforward nature of the analysis. However, there is a noticeable confusion between CEA and cost-utility analysis (CUA), as some studies have incorrectly labeled them. Additionally, there is an absence of cost-benefit analysis (CBA) in the reviewed studies from Bangladesh.

The technical execution of the studies reviewed shows various deficiencies, including incomplete adherence to standard analytic procedures and a lack of transparency in reporting. The perspective from which costs and outcomes are analyzed is often not clearly defined. While most studies attempt to identify costs comprehensively, they frequently miss key cost components and lack standardized methods for costing. There is also a general lack of detail regarding the data collection processes and insufficient consideration of factors like currency exchange rates and purchasing power parity.

Moreover, sensitivity analyses in these studies tend to be one-dimensional, not incorporating a multidimensional approach or adequately addressing uncertainty. Discussions on the generalizability of findings, ethical considerations, and the affordability of interventions are often missing, which are crucial for informing policy decisions.

To enhance the quality of economic evaluations in Bangladesh, there is a need for improved training for researchers and the development of country-specific guidelines. Prioritizing economic evaluations on interventions that significantly impact population health, especially those targeting maternal and child health, aligns with national health goals and the Millennium Development Goals (MDGs). This review acknowledges limitations, such as its reliance on published literature in peer-reviewed journals and the exclusion of grey literature. Nonetheless, addressing these identified shortcomings is crucial for ensuring that economic evaluations effectively inform healthcare decision-making in Bangladesh.

5. Implications of the Study

Here are several research implications derived from the discussion in the provided research. There is a need for targeted investment in the training and development of researchers specializing in health economics and economic evaluation methodologies. This can be achieved through capacity-building programs, workshops, and collaborations with international institutions to facilitate knowledge and skill transfer. Bangladesh should consider developing its own guidelines for conducting economic evaluations of health interventions. These guidelines should address methodological standards, reporting requirements, and specific considerations related to the country's context, such as healthcare infrastructure, disease burden, and resource constraints. Given the limited resources available, it is crucial to prioritize economic evaluations on interventions that tackle major health challenges in Bangladesh, particularly those associated with the Millennium Development Goals (MDGs) like maternal and child health. Research efforts should focus on interventions with the potential for substantial population health impact. Researchers should ensure methodological rigor in economic evaluations. This includes clearly defining the analysis perspective, using standardized costing methods, conducting thorough sensitivity analyses, and considering multidimensional uncertainty assessments. There is a need for greater transparency in reporting economic evaluation studies. Researchers should provide detailed descriptions of data sources, data collection methods, and analytical procedures to enhance the reproducibility and credibility of their findings. While cost-effectiveness analysis (CEA) is commonly used, exploring other methods such as cost-benefit analysis (CBA) and cost-utility analysis (CUA) could offer valuable insights into their applicability in the Bangladeshi context. Collaboration between researchers, policymakers, donors, and other stakeholders is essential to ensure that economic evaluations address relevant policy questions and inform decision-making effectively. Involving stakeholders throughout the research process can enhance the relevance and uptake of study findings. Conducting longitudinal studies can provide valuable insights into the long-term economic implications of health interventions in Bangladesh. These studies can help

assess the sustainability and scalability of interventions, aiding policymakers in making informed decisions about resource allocation and program implementation. Economic evaluations should not only focus on cost-effectiveness but also consider ethical implications, equity concerns, and social impact. Integrating ethical considerations into economic evaluation frameworks can help ensure that healthcare interventions are implemented in an efficient and equitable manner. Combining quantitative economic evaluations with qualitative research methods can provide a more comprehensive understanding of the contextual factors influencing the implementation and effectiveness of health interventions in Bangladesh. Mixed methods approaches can capture nuances that quantitative analysis alone might miss.

By addressing these research implications, Bangladesh can enhance its capacity to conduct high-quality economic evaluations of health interventions, thereby improving the evidence base for healthcare decision-making and ultimately contributing to better health outcomes for its population.

6. Conclusion

This review highlights the limited number of economic evaluations concerning health interventions in Bangladesh. There are numerous untapped areas, including the economic evaluation of various disease treatments and alternative medications. Although cost-effectiveness analysis is the most frequently utilized method, many studies do not fully adhere to rigorous economic evaluation standards, resulting in analyses that lack robustness. To remedy these gaps, it is crucial to strengthen capacity in health economics and the economic evaluation of health programs. Researchers, policymakers, and donors should focus on prioritizing areas for economic evaluation that align with the national burden of diseases, potential alternative interventions, and opportunities for health investments. Given the limited resources in Bangladesh and other developing countries, conducting thorough economic evaluations should become a standard practice. This would aid in decision-making, allow for considerations of generalizability, and support the scaling up of interventions and programs within the healthcare sector.

7. Limitations and Future Research Directions

In attempting to include a broad range of economic evaluation studies, the review may have overlooked significant research due to the exclusion of non-English publications and grey literature. This limitation could lead to an incomplete picture of the landscape of economic evaluations in Bangladesh. While efforts were made to assess the methodological quality of the included studies, subjective judgments may have influenced the evaluation process. Furthermore, the checklist used to assess methodological quality may not have captured all

relevant aspects, potentially underestimating the quality of the studies.

The review focused on peer-reviewed articles, which could introduce publication bias, favoring studies with positive results or those by established researchers. This bias might affect the generalizability of the findings, potentially not reflecting the full landscape of economic evaluations in Bangladesh. Despite comprehensive data extraction efforts, there may still be instances of incomplete or inadequate reporting, which could limit the depth of insights gained from the reviewed literature.

Future economic evaluation studies in Bangladesh should adhere to standardized guidelines and reporting frameworks to ensure methodological rigor and transparency. This includes clearly defining study perspectives, describing competing alternatives adequately, and conducting sensitivity analyses to assess the robustness of results. Strengthening capacity in health economics and economic evaluation among researchers, policymakers, and healthcare practitioners in Bangladesh is crucial. Training programs and workshops on economic evaluation methods could improve the quality of future studies and support evidence-based decision-making.

Future research should prioritize interventions with significant public health impacts and align with national health priorities and goals. This includes targeting areas like maternal and child health, infectious diseases, and non-communicable diseases to maximize the potential impact on public health outcomes. Engaging stakeholders, including policymakers, healthcare providers, and community members, in the economic evaluation process is essential to ensure that research findings are relevant and actionable. This could involve participatory research methods, such as stakeholder consultations or focus group discussions, to incorporate diverse perspectives into study design and interpretation.

Lastly, future economic evaluations should consider longitudinal study designs to assess the long-term cost-effectiveness and sustainability of health interventions in Bangladesh. Longitudinal data collection could provide valuable insights into the evolving nature of healthcare interventions and their long-term impact on population health outcomes. Additionally, economic evaluations should explicitly consider equity, including the distributional impact of health interventions on various population groups. Assessing equity implications can help identify strategies to reduce disparities in healthcare access and outcomes and promote social justice in resource allocation decisions.

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