International Journal of Health Economics and Policy
2024, Vol. 9, No. 4, pp. 117-125
https://doi.org/10.11648/j.hep.20240904.13

Research Article

Assessing the Viability of a Professionally Managed community-Based Health Insurance Scheme in Koungheul, Senegal: Perspectives for Universal Health Coverage

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Abstract

Introduction: This study examines the viability of the Departmental Health Insurance Unit (UDAM) of Koungheul in Senegal, an innovative model of a professionally managed health insurance scheme, implemented as part of universal health coverage. Unlike traditional community-based health insurance schemes, UDAMs are entirely managed by a salaried team, with elected leaders playing only a supervisory role. The study aims to assess the viability of this alternative model and analyze the perceptions of various stakeholders. Methodology: The study adopted a mixed approach, combining quantitative and qualitative methods. The quantitative analysis, based on a theoretical framework developed by the International Labor Office (ILO), assessed the viability of the UDAM across four dimensions: institutional, technical, functional, and financial/economic. Data collected in 2022 were analyzed. For the qualitative component, individual interviews and focus groups were conducted with various actors, including beneficiaries, non-beneficiaries, community leaders, UDAM officials, and healthcare providers. Results: The study reveals a contrasting situation for the UDAM of Koungheul. On the institutional and technical levels, the UDAM has a solid foundation with legal status, agreements with healthcare providers, and risk control mechanisms. Functional viability shows positive signs, with a membership growth rate of 16.15% and a high penetration rate of 76.66%. However, the contribution collection rate is low (52.29%), and the average payment delay to providers is long (7 months). The financial situation is concerning: the immediate liquidity ratio is low (0.248), the reserve rate is insufficient (0.93 months), and the loss ratio is high (90.34%). Stakeholder perceptions are generally positive, but significant practical difficulties are identified, including lack of information, funding problems, and procedural complexity. Conclusion: The study highlights the progress of the UDAM model compared to traditional schemes. However, persistent challenges, particularly in terms of financial viability, underscore the need for continuous evolution of the model. A more integrated approach, involving deeper integration into the national social protection system and stronger state investment, could be beneficial in consolidating the gains of the UDAM model.

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Received: 5 October 2024; **Accepted:** 25 October 2024; **Published:** 12 December 2024

Keywords

Viability, Professionally Managed, Health Insurance

1. Introduction

The pursuit of universal health coverage (UHC) represents a major challenge for many African countries, where a large part of the population works in the informal sector and lacks access to health insurance [1]. Faced with this reality, community-based health insurance models have been experimented with, yielding mixed results [2].

In Senegal, the search for innovative solutions to extend health coverage has led to the emergence of a new model: the Departmental Health Insurance Units (UDAMs). Unlike traditional community-based health insurance schemes, UDAMs are distinguished by fully professionalized management, with elected leaders not intervening in day-to-day operations. This model aims to overcome limitations often observed in community-based schemes, such as low management capacity, lack of financial viability, and difficulties in negotiating with healthcare providers [3, 4].

Studies on health insurance schemes in Africa have extensively documented these challenges [2-5]. However, little research has been conducted on the effectiveness and viability of these alternative models, which represent a potentially promising approach for African countries seeking solutions on the path to UHC [6-8].

The UDAM of Koungheul, operational since 2014 in a rural area characterized by a high poverty rate, offers a unique opportunity to evaluate this innovative model. Our study adopts a holistic approach, examining not only the technical, functional, institutional, and financial viability [9] of the UDAM, but also the perceptions of various stakeholders.

The objective of this research is to comprehensively evaluate the viability of the Koungheul UDAM after nine years of operation, to identify the strengths and weaknesses of this professionalized management model, and to verify whether it is truly a viable option on the path to UHC in Africa.

2. Methodology

2.1. Presentation of the Koungheul UDAM

The Departmental Health Insurance Unit (UDAM) of Koungheul is a community-based health insurance scheme with professional management, created in 2014 as part of the national Universal Health Coverage policy launched in 2013 in Senegal. Unlike traditional community-based schemes, the UDAM's management is entirely handled by a salaried team, while the elected leaders from the community play only a supervisory and guidance role. The UDAM covers the entire Koungheul department, including both urban and rural areas.

The Koungheul department, located in the Kaffrine region in central Senegal, had an estimated population of 210,120 inhabitants in 2020, with a density of 50 inhabitants per km², according to the National Agency for Statistics and Demography (ANSD). The Koungheul department is characterized by a high poverty rate, estimated at 52% according to the Senegal Poverty Monitoring Survey (ESPS), making it one of the highest in the country. The local economy is mainly based on agriculture, livestock farming, and informal trade.

The funding sources for the Koungheul UDAM are diverse. They include member contributions, state subsidies—which constitute the main source—subsidies from local authorities intended for the care of indigent persons, and support from technical and financial partners.

2.2. Data Collection and Analysis

To study the viability of the Departmental Health Insurance Unit (UDAM) of Koungheul, we adopted a mixed methodological approach, incorporating both quantitative and qualitative components. This approach allowed us to evaluate the viability of the UDAM according to four key dimensions—institutional, technical, functional, and financial—on one hand, and to explore the perceptions of various stakeholders on the other.

For the quantitative component, we relied on the theoretical framework developed with the support of the International Labor Office (ILO) [9]. This framework proposes a series of indicators to assess the determinants of the viability of a health insurance system, understood through four dimensions (institutional, technical, functional, and financial/economic), each comprising various indicators. Institutional viability relates to the existence of a legal and regulatory framework, as well as relationships with providers and local authorities, among others. Technical viability is measured by examining membership conditions, benefits management, and risk control mechanisms. Functional viability is assessed in terms of membership dynamics, the level of contribution collection, and provider payment delays, among other factors. Financial and economic viability is measured through solvency indicators, financial ratios, cost structure, etc. The viability analysis covered data for the entire year 2022.

The qualitative component of the study, conducted from July 10 to 16, 2023, aimed to understand the perceptions of

various stakeholders regarding mutual health insurance and the factors influencing membership in the UDAM. We employed several data collection methods, including semi-structured individual interviews with thirty UDAM beneficiaries, thirty non-beneficiaries, UDAM officials, healthcare providers, and representatives from the Senegalese Universal Health Coverage Agency. Focus groups were conducted with community leaders, complemented by direct observations of the UDAM's operational processes.

The interviews and focus groups were recorded, transcribed, and analyzed using a thematic approach, allowing for the identification of the main emerging themes related to perceptions of the UDAM and factors influencing membership and retention. Quantitative data were entered and analyzed using Epi Info version 7.3.2 and Microsoft Excel software.

3. Results

3.1. Institutional Viability of the UDAM

The UDAM benefits from legal recognition by administrative authorities and is governed by statutes and internal regulations. Its legal framework aligns with Regulation No. 07/2009/CM/UEMOA of June 26, 2009, which regulates social mutuality within the West African Economic and Monetary Union (UEMOA). The Koungheul UDAM has an organizational chart, and relationships with health facilities are formalized through agreements that define the terms of member care, as well as billing and payment procedures. A system for controlling invoices has been established, supervised by a medical advisor recruited by the UDAM. Additionally, the mutual benefits from local government support. Finally, regarding supervision and control, the UDAM underwent various supervisory missions by the Universal Health Coverage Agency in 2022.

All these elements—legal recognition, defined organizational structure, formalized relationships with healthcare providers, local government support, and supervision mechanisms—constitute a solid institutional base for the Koungheul UDAM.

3.2. Technical Viability of the UDAM

The assessment of the technical viability of the Koungheul UDAM highlighted several mechanisms aimed at controlling risks inherent to health insurance. Membership in the UDAM is voluntary, family-based, or organized by groups, corresponding to a membership modality monitoring score of 1 according to the ILO grid (ranging from 0 for no risk to 4 for high risk), indicating a low risk of adverse selection. To mitigate this risk, the UDAM has established a minimum basic membership unit of 5 people. Additionally, an observation period of 30 to 60 days, depending on the contribution frequency, is applied for all new members. These measures aim to reduce the likelihood that only individuals with immediate healthcare needs join the mutual.

To control overconsumption and overprescription, the UDAM has implemented several mechanisms. Covered services are managed through a copayment mechanism with a moderating ticket. Patients are required to follow a mandatory care pathway that conforms to Senegal's healthcare pyramid. Insured individuals must first use health posts before being referred, if necessary, to the health center. For services at the regional hospital, mutual patients must present a referral or examination bulletin to the UDAM, which then issues a letter of coverage. Prior agreement is mandatory for the coverage of costly services, and a medical advisor is responsible for monitoring compliance with care protocols.

3.3. Functional Viability

The assessment of the functional viability of the Koungheul UDAM revealed mixed results. Membership dynamics were analyzed through three main indicators: gross growth rate, retention rate, and penetration rate.

The UDAM's gross growth rate in 2022 was 16.15%, calculated based on the evolution of the number of members between 2021 and 2022 (from 15,887 to 18,453 members). This positive rate indicates that the mutual is in a growth phase. The UDAM's retention rate in 2022 was 116.15%, exceeding the 100% norm. The penetration rate showed favorable evolution, increasing from 49.14% in 2020 to 54.81% in 2021, and reaching 76.66% in 2022. However, the contribution collection rate in 2022 stood at only 52.29%, well below the 100% norm. This low rate is mainly attributed to the non-payment of state subsidies intended to cover contributions for indigent persons.

Regarding provider payments, the analysis revealed an average payment delay of 7 months, representing a significant delay compared to contractual commitments.

3.4. Financial and Economic Viability of the UDAM

The analysis of the financial and economic viability of the Koungheul UDAM revealed weak results in 2022. The solvency assessment, conducted through three key ratios, highlighted significant difficulties.

The immediate liquidity ratio stood at 0.248, well below the recommended threshold of 1. This low ratio indicates that the UDAM was unable to meet its short-term commitments, particularly regarding the payment of its providers within agreed timeframes. This situation is largely explained by the delayed payment of subsidies by the state.

The equity ratio stood at 288%. Although this ratio is positive, it should be interpreted with caution given the other financial indicators. It suggests that the UDAM has some capacity to honor its long-term debts, but this capacity is compromised by short-term liquidity problems.

The expense coverage ratio, or reserve rate, indicated that

the UDAM could sustain operations for an average of only 0.93 months without needing new financial inflows. This figure is below the recommended norm of 12 months and indicates a lack of financial autonomy.

The analysis of activity financing showed that the ratio of acquired contributions to expenses was 0.77. Thus, contributions only covered a portion of the UDAM's expenses in 2022. Consequently, the positive results of the mutual heavily depended on other funding sources, notably state and partner subsidies.

The UDAM's loss ratio in 2022 was 90.34%, exceeding the recommended indicative norm of 75%. This high ratio means that the UDAM used a significant portion of acquired contributions for healthcare payments.

Finally, the gross operating expense ratio was 18.4%, above the recommended threshold of 15%.

The main indicators of financial and functional viability of the Koungheul UDAM are summarized in Table 1.

Table 1. *Key sustainability indicators of the Koungheul UDAM in 2022.*

Indicator	Value	Recommended Threshold	Interpretation
Gross Growth Rate	16.15%	Positive growth	Positive
Retention Rate	116.15%	≥ 100%	Positive
Penetration Rate	76.66%	-	Positive trend
Contribution Collection Rate	52.29%	100%	Low
Average Payment Delay to Providers (months)	7	In accordance with contractual commitments	Significant delay
Immediate Liquidity Ratio	0.248	≥ 1	Below the threshold; short-term liquidity problems
Equity Ratio	288%	Positive	Although this ratio is high, it should be considered considering the identified short-term liquidity issues.
Reserve Ratio (months)	0.93	12 months	Very low; lack of financial autonomy
Contributions to Expenses Ratio	0.77	≥ 1	Contributions do not cover expenses
Loss Ratio	90.34%	75%	Above the recommended threshold; high benefit expenses
Gross Operating Expense Ratio	18.4%	15%	Above the threshold; high operating expenses

3.5. Stakeholder Perceptions

The qualitative study allowed for the collection of perceptions from various stakeholders about the Koungheul UDAM.

UDAM beneficiaries generally expressed positive opinions. The majority considered the UDAM a very good opportunity, facilitating access to care at a lower cost. However, some beneficiaries raised concerns, notably regarding long waiting times in health facilities. Recommendations from beneficiaries included reducing the observation period, improving communication to encourage massive membership, preventing drug stockouts, and recruiting additional staff to reduce waiting times.

Non-beneficiaries primarily cited a lack of information and financial means as barriers to their membership. A significant proportion (56.66%) of non-beneficiaries reported being aware of the UDAM's existence, but a lack of detailed information remained a major obstacle for 50% of them. Other reasons cited included lack of time (17%), lack of financial means (23%), and inability to gather the minimum number of people required for membership (10%).

Community leaders emphasized the importance of the UDAM while identifying areas for improvement. They notably highlighted the need to strengthen communication, review the minimum membership criterion of 5 people, and improve the availability of medications. They also stressed the importance of involving all actors at the departmental level in communication and strengthening trust relationships between populations, providers, and mutual managers. UDAM officials and the regional head of the CMU recognized the benefits of the mutual for the population while highlighting operational challenges. They mentioned difficulties related to the department's size, weak logistical resources, drug stockouts in health facilities, and delays in state subsidy payments. Their recommendations included strengthening personnel and logistics, improving institutional and proximity communication, and ensuring timely payment of state subsidies.

Healthcare providers generally acknowledged the benefits of the UDAM for the population. However, they raised concerns about barriers to membership, such as contribution costs, lack of financial means among the population, and drug stockouts. They also emphasized the importance of timely reimbursement to health facilities and the need to review rates due to increasing drug prices.

Table 2 below presents a summary of the perceptions of the various stakeholders of the Koungheul UDAM.

Table 2. *Summary of the perceptions of the stakeholders of the Koungheul UDAM.*

Stakeholders	Positive Perceptions	Identified Challenges	Recommendations
Beneficiaries	Facilitated access to affordable healthcare	Long waiting times in health facilities	Reduce the observation period, enhance communication for mass enrollment, prevent medication stockouts, hire additional staff
Non-Beneficiaries	Awareness of UDAM [56.66%)	Lack of detailed information (50%), lack of financial means (23%), inability to gather the minimum required number of people for enrollment (10%)	Improve information dissemination, reduce financial barriers, relax enrollment criteria
Community Leaders	Importance of UDAM for the community	Need to strengthen communication, minimum enrollment criterion of 5 people, medication availability	Involve all stakeholders at the departmental level, strengthen trust between communities, providers, and mutual fund managers
UDAM Officials and Regional CMU Service Chief	Recognized benefits for the population	Vastness of the department, insufficient logistical means, medication stockouts, delays in state subsidy payments	Strengthen personnel and logistics, improve institutional and local communication, ensure timely payment of state subsidies
Healthcare Providers	Recognized benefits for the population	Enrollment obstacles: contribution costs, lack of financial means among the population, medication stockouts	Timely reimburse health facilities, review tariffs due to rising medication prices

4. Discussions

Professionally Managed Mutual: A Promising Alternative Model to the Limitations of Traditional Community-Based Health Insurance

The evaluation of the Koungheul UDAM reveals a solid institutional and technical foundation, reflecting the initial ambitions of the professionalized mutual model as an alternative to traditional community-based health insurance schemes. This model, developed in response to challenges identified in the traditional mutual system [8], aims to overcome the limitations of small community-based mutuals, particularly their weak financial viability and limited capacity to negotiate with healthcare providers [2, 4, 10-12].

The formal legal recognition of the Koungheul UDAM and its compliance with Regulation No. 07/2009/CM/UEMOA demonstrate a professionalization of management, a crucial aspect often lacking in traditional community-based mutuals [3, 13, 14]. This solid legal foundation, associated with a clear organizational structure, directly addresses the identified need for more professional management that is less dependent on volunteerism [2, 14, 15].

The existence of formalized agreements with health facilities and the presence of a medical advisor for invoice control enhance the capacity to negotiate and assert the interests of the insured with healthcare providers. This feature is particularly important as it addresses one of the major challenges of traditional mutuals: the power imbalance between insurers and providers, which limited the ability of small mutuals to effectively control the quality and costs of care [3].

Technically, the mechanisms implemented by the Koungheul UDAM to control risks of adverse selection, overconsumption, and overprescription are more elaborate than those generally observed in traditional community-based mutuals [6, 16]. Family membership with a minimum of 5 people and the observation period for new members are measures aimed at creating a larger and more stable risk pool, thus addressing the problem of low penetration rates and adverse selection that have affected traditional mutuals [15, 17].

These positive results in terms of institutional and technical viability are consistent with those observed in other UDAMs, such as those in Foundiougne [18] and Diourbel [19]. This

convergence suggests that the UDAM model succeeds, to some extent, in reducing the structural weaknesses of traditional community-based mutuals identified during the project design [20].

However, despite these significant advances, the Koungheul UDAM faces persistent challenges, particularly in terms of financial viability. Delays in state subsidy payments and difficulties in contribution collection remind us that the UDAM model, although more robust, is not exempt from the socio-economic constraints that have already affected traditional mutuals [4, 14, 21, 22]. These difficulties highlight the crucial importance of continued support from the state and partners [20] and raise questions about the viability of the mutual model in a context of poverty [22-25].

Close collaboration with local authorities, particularly the inclusion of mayors on the board of directors, represents a positive evolution compared to traditional mutuals. This approach allows for maintaining strong community anchoring while benefiting from enhanced institutional support. A similar strategy has been attempted in other countries, such as Rwanda [26], and has produced interesting results.

Promising Membership Dynamics in the Face of Functional and Financial Viability Challenges

The analysis of the functional and financial viability of the Koungheul UDAM reveals a contrasting situation. On one hand, it illustrates the advances of the professionally managed mutual model compared to traditional community-based mutuals, and on the other hand, it confirms the persistent challenges in implementing universal health coverage in Senegal.

The membership dynamics of the Koungheul UDAM shows encouraging signs. The gross growth rate of 16.15% in 2022 indicates a steady progression of the membership base, far exceeding the performance generally observed in traditional community-based mutuals [11, 27-30]. This result, although lower than those reported for the UDAMs of Diourbel (58.89% in 2019) [19] and Foundiougne (19.38% in 2017) [18], demonstrates a significantly improved capacity to attract and retain members. The retention rate of 116.15%, above the 100% norm, confirms this positive trend and suggests a high level of member satisfaction. In this regard, the UDAM performs better than what has been reported by various studies in Senegal on community-based mutuals [3, 31, 32].

Even more remarkable is the penetration rate of 76.66% achieved in 2022, far exceeding the national target of 75% set in the strategic plan for the development of universal health coverage [33]. This result is particularly impressive compared to the generally low penetration rates of traditional community-based mutuals [2]. This significant progression demonstrates the capacity of the UDAM model to overcome one of the main obstacles faced by traditional community-based mutuals: low population enrollment [4].

However, despite these notable advances in membership, the Koungheul UDAM faces significant challenges in terms of financial viability, reminiscent of some difficulties encountered by traditional mutuals [4]. The contribution collection rate of 52.29%, although below the 100% norm, is comparable to those observed in other UDAMs such as Foundiougne (69.62%) [18] and Diourbel (78.22%) [19].

This situation highlights a paradox of the UDAM model. Although it has succeeded in attracting and retaining a significant number of members, its financial viability remains fragile. The average payment delay to providers of 7 months illustrates this fragility and risks compromising the quality of care and provider trust in the long term—crucial issues that the UDAM model initially aimed to improve compared to traditional mutuals.

Financial indicators, such as the immediate liquidity ratio (0.248) and the reserve rate (0.93 months), although concerning, must be interpreted in the context of the relative youth of the Koungheul UDAM and the structural challenges of the Senegalese health system. The loss ratio of 90.34%, exceeding the recommended norm of 75%, indicates significant resource usage for healthcare payments, which is positive in terms of access to care for members but raises questions about long-term financial sustainability.

These results highlight an inherent tension in the UDAM model. On one hand, it succeeds in significantly expanding health coverage; on the other, it struggles to achieve financial autonomy, remaining dependent on state subsidies, as was the case for traditional mutuals [3, 15].

Stakeholder Perceptions: Between Satisfaction and Areas for Improvement

The analysis of perceptions from various stakeholders of the Koungheul UDAM reveals trends similar to those observed in other studies on health mutuals in Senegal, while highlighting certain improvements brought by the UDAM model.

The generally positive perception of beneficiaries, who consider the UDAM an important opportunity to facilitate access to care at a lower cost, is consistent with results from previous studies on health mutuals in Senegal [17, 32]. This favorable assessment suggests that the UDAM model has succeeded in maintaining, or even improving, member satisfaction compared to traditional mutuals. However, complaints about long waiting times in health facilities echo similar problems identified in other studies on health mutuals [17, 34, 35]. This indicates that some challenges related to the quality of care persist despite the change in model.

Barriers to membership cited by non-beneficiaries, primarily a lack of information and financial means, are recurrent obstacles identified in the literature on health mutuals in sub-Saharan Africa [17, 36]. However, the high penetration rate of the UDAM (76.66%) represents a significant improvement compared to rates generally reported for traditional community-based mutuals in Senegal, which are often very low [14, 31]. This progression suggests that the UDAM model has partially succeeded in overcoming these traditional obstacles.

Suggestions from community leaders regarding strengthening communication and revising membership criteria reflect similar concerns expressed in other mutual contexts in West Africa [36]. The active involvement of these leaders in finding solutions demonstrates strong community anchoring, an aspect that the UDAM model seems to have preserved from traditional mutuals while professionalizing it.

The operational challenges highlighted by UDAM officials, particularly difficulties related to the department's size and delays in state subsidy payments, echo management and financing problems frequently reported in studies on health mutuals in Senegal and the region [7, 20]. The persistence of these challenges suggests that, despite its innovative design, the UDAM model has not entirely resolved the structural problems that have affected traditional mutuals.

Concerns expressed by healthcare providers regarding payment delays and the need to review rates are recurring issues in health risk pooling systems in Africa [3]. However, the UDAM's ability to maintain functional relationships with providers despite these difficulties could indicate an improvement compared to traditional mutuals, which often struggled to negotiate effectively with health facilities [20].

5. Limitations of the Study and Perspectives for Further Research

Although our study provides valuable insights into the viability of the professionally managed community-based mutual model, it is important to recognize certain limitations that may influence the interpretation and generalization of results.

Firstly, the study period limited to the year 2022 for quantitative analysis does not allow for capturing long-term trends in the UDAM's viability. A longitudinal analysis over several years could provide a more complete picture of the evolution of the UDAM's performance.

Secondly, although the study included various stakeholders in its qualitative component, the relatively limited sample size for each group [30 beneficiaries and 30 non-beneficiaries) may not be entirely representative of the diversity of experiences and opinions within the UDAM's target population. A larger sample could reveal additional nuances in perceptions.

Thirdly, the study focused on a single UDAM in a specific department of Senegal. The socio-economic and health particularities of Koungheul may limit the generalization of results to other contexts, even within Senegal. A comparison with other UDAMs in different regions could offer a broader perspective on the performance of the UDAM model in various contexts.

Finally, the evaluation of the quality of care provided to UDAM members was not directly measured. This is a limitation to our understanding of the system's actual effectiveness in improving the health of the covered population. An assessment of health impact could have strengthened the analysis of the added value of the UDAM model compared to traditional mutuals.

6. Conclusion

Community-based health mutuals in Senegal have long faced major challenges that compromise their viability and effectiveness. A too-narrow membership base, low penetration rate, limited volunteer management, and power imbalances with healthcare providers have led to the search for a more robust alternative model. It is in this context that UDAMs, fully professionally managed health mutuals, were designed and implemented.

The experience of the Koungheul UDAM reveals significant advances compared to traditional mutuals, particularly in terms of professionalizing management, broadening the membership base, and enhancing capacity to negotiate with healthcare providers. However, persistent challenges, especially in terms of financial viability, highlight the need for continuous evolution of the model.

To capitalize on the strengths of UDAMs while overcoming their weaknesses, a more integrated and innovative approach is necessary. This could involve deeper integration into the national social protection system and stronger state investment.

Abbreviations

ANSD	National Agency for Statistics and Demography
ILO	International Labor Office
ESPS	Senegal Poverty Monitoring Survey
UDAM	Departmental Union of Health Insurance
UEMOA	West African Economic and Monetary Union
UHC	Universal Health Coverage

Conflicts of Interest

The authors declare no conflicts of interest

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