

AN EXPLORATORY STUDY ON THE POTENTIAL OF SUKUK INVESTMENT IN MATERNAL HEALTH CARE IN DEVELOPING ECONOMIES

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ABSTRACT

This study analyzed the effectiveness of sukuk as a strategic financing tool to improve women's healthcare delivery in developing economies, using comparative studies of Nigeria and Malaysia. The study aimed to answer two questions: first, the impact of sukuk financing of healthcare investment on women's access to healthcare, and second, the relationship between sukuk financing and women's health outcomes. The study used secondary data from 2016 to 2025 and adapted a quantitative comparative research design. Multiple regression and correlation analyses examined the relationship between sukuk financing of healthcare, healthcare accessibility, antenatal utilization, reductions in maternal mortality, and skilled birth attendance. The results indicated that healthcare investment using sukuk contributes to women's healthcare accessibility (regression coefficient of 1.483) and maternal health outcomes (regression coefficient of 1.126) at the 5 percent level. The study showed that sukuk can serve as an ethical capital-mobilization tool to bolster a women-centric healthcare system. Its implications for policymakers, Islamic financial institutions, and development agencies in finding sustainable financing options for the health sector are practically significant. The study concluded that well-designed healthcare Sukuk can help to catalyze progress toward women's health equity and enable sustainable transformation in healthcare in developing economies.

Keywords: Sukuk, Women's Healthcare Financing, Maternal Health Outcomes, Developing Economies.

INTRODUCTION

Poor financing of women's health service delivery has long been a structural issue in developing economies, especially where low fiscal capacity, other developmental demands, and inefficient resource allocation limit public health spending. Inequalities in access to quality maternal health services by women continue to grow in many LMICs due to poor investment in the infrastructure of maternal care, skilled health workers, diagnostic systems, and healthcare delivery mechanisms that are responsive to gender. This funding gap leads to high levels of maternal mortality, poor antenatal attendance, poor diagnosis of reproductive health problems, and significant inequalities in access to specialist women's health care services between urban and rural areas. Structural debt financing issues have been observed to focus less on long-term social infrastructure investments and outcomes and more on short-term fiscal balancing (Mahomed, 2022; Laldin & Djafri, 2021). In this

context, Islamic social finance is becoming a viable alternative financing architecture for developmental sectors that require long-term ethical financing. Sukuk is one of the most innovative instruments and has attracted significant policy and scholarly interest as a Shariah-compliant financing structure with the potential to raise large amounts of funds for socially productive investments. Unlike interest-driven conventional bonds, sukuk are asset-driven or asset-linked, requiring risk-sharing, transparency, and direct ties to real economic activities. This structure makes sukuk an ideal instrument for funding social infrastructure sectors such as healthcare, education, and public welfare systems (Al Madani et al., 2020; Hafsa & Oumaima, 2021). In recent years, research has shown that infrastructure financing applications of socially responsible investment sukuk are not limited to infrastructure; they can also help achieve other developmental goals, such as strengthening health systems and improving social equity. Ahmad. (2024) noted that social sukuk structures have grown considerably because they link financial mobilization to tangible social impact. Likewise, Fadzil and Haikal (2024) argued that sukuk can transform socially inclusive development because their governance mechanisms include accountability and the direct allocation of funds and resources.

This trend is more prominent in countries like Malaysia, where the public sector has marketed and implemented SRI sukuk to finance economic development projects. In recent years, sukuk has played an increasingly important role in healthcare financing. Mahomed (2022) highlighted the need for alternative, non-conventional financing solutions to support large-scale capital investments, noting a chronic funding gap in Sub-Saharan Africa's infrastructure financing. Hammad and Hammad (2026) also argued that physician-led private investment, through a combination of sukuk and waqf, offers a novel way to address physician shortages in specialist care in developing regions.

Their research highlighted Islamic finance mechanisms' ability to facilitate the development of scalable healthcare facilities and infrastructure, especially in areas that have not attracted investment through conventional fiscal mechanisms. The women's health industry is particularly attractive for sukuk-based intervention because of its developmental importance. Women's health affects a wide range of socio-economic development indicators, such as labour productivity, family well-being, and human capital formation across generations. However, systematically, women's health funding is under-prioritized in many developing countries, including Nigeria. Although recent developments have seen wider acceptance of Islamic finance in Nigeria, sukuk use has been limited to infrastructure development and education, with less focus on healthcare delivery; this research examines the limited attention to strategic positioning for healthcare systems seeking to enhance women's healthcare delivery. This highlights a policy and empirical gap in whether sukuk can be designed to address deficits in women-centred health financing.

Recent research suggests blending sukuk and waqf financing with sustainable finance governance models to tackle social inequalities. Rochaniah and Faizah (2025) and Isahi et al (2024) showed that cash waqf-sukuk can ameliorate social service gaps. In contrast, Al Daihani and Abdullah (2023) suggested waqf financing models in the health sector as sustainable financing models. Consequently, this study argues that a hybrid system of Islamic ethical finance mechanisms could deliver more robust healthcare services for women in developing economies.

However, little quantitative evidence links sukuk-financed investments to improvements in women's healthcare access and maternal health outcomes, and much existing scholarship remains largely conceptual. A significant research gap is the lack of

empirical research examining the connection between sukuk financing and actual improvements in healthcare outcomes. Although extensive research has been undertaken in terms of the roles and impacts of sukuk in economic empowerment, sustainable development, and infrastructure financing (Guedira et al., 2024; Kassim, 2024; Rahman et al., 2022), the impact of sukuk in the specific delivery of healthcare services to women remains to be assessed. This raises questions about the effectiveness of sukuk interventions and the measurable developmental effects of financing women's health. This study was designed to fill this gap by providing a focused empirical evaluation of sukuk as an investment avenue for women's healthcare delivery in developing economies, with a primary focus on Nigeria and a comparative study with Malaysia. The study critically analyzed the impact of sukuk financing on healthcare investments, including its role in enhancing women's access to health services and its link to maternal health outcomes. This study aimed to assess the feasibility and development impact of sukuk as a financing option to improve healthcare delivery systems for women in developing economies.

Statement of the Problem

While health is a fundamental human right and a pillar of economic development, millions of women in developing nations remain locked out of the healthcare system. Every day, women face a complex web of gender-specific barriers that restrict their access to care. These include the exhausting distances to rural clinics, the threat of financial ruin from out-of-pocket medical bills, a severe shortage of specialized maternal diagnostic equipment, and deep-seated cultural mistrust of public medical facilities. Traditional public finance is failing to solve this crisis. Many emerging economies are currently drowning in high sovereign debt, which severely limits general government spending. When governments borrow through conventional, interest-bearing debt, they rarely ring-fence the funds for social projects. Instead, general treasury pools absorb it, and it fails to reach the local, specialized clinics women desperately need. Sukuk (Islamic asset-backed bonds) offer a highly promising alternative. Because these ethical, risk-sharing instruments require a tangible underlying asset, they channel capital directly into concrete projects like healthcare infrastructure. However, a major gap in academic research remains: how to deploy these financial tools in practice to improve women's lives. Current literature has not yet explored how different Sukuk models—such as Ijara (leasing) or Waqf-linked (endowment) structures—can be optimized to place maternity clinics in remote villages, eliminate catastrophic out-of-pocket costs, secure life-saving diagnostic equipment, and build community trust. Without a clear framework connecting Islamic finance directly to women's health outcomes, researchers, policymakers, and development banks lack the practical blueprint needed to leverage this massive source of capital to save women's lives.

Specifically, the study pursued two objectives:

- i. To examine the effect of sukuk-financed healthcare infrastructure investment on women's healthcare accessibility in developing economies.
- ii. To evaluate the relationship between sukuk-based healthcare financing and maternal health outcomes.

To achieve these objectives, the study was guided by the following research questions:

1. To what extent did sukuk-financed healthcare investments improve women's access to quality healthcare services in developing economies?
2. What relationship existed between sukuk-based healthcare financing and maternal health outcomes?

This study argued that sukuk could catalyze a shift in healthcare financing toward inclusive, gender-responsive developmental outcomes. The study aimed to provide quantitative data on its performance in the context of women's health investments and add a useful voice to the ongoing debate on Islamic social finance for sustainable health transformation in developing economies.

LITERATURE REVIEW

Conceptual Review

Conceptualizing Sukuk as a Development Finance Instrument

This section explains Sukuk as a development finance instrument. In modern Islamic finance literature, sukuk has increasingly been embraced as a viable developmental financing tool for long-term capital formation needs in emerging markets (Salaudeen, 2021). Sukuk are certificates representing ownership of tangible assets, usufruct, services, or investment activities, structured in accordance with Shariah law and ethics. Unlike conventional debt securities, which are primarily interest-based, sukuk financing is built on an asset-based or asset-linked model that incorporates risk-sharing, transparency, and productive economic engagement (Hafsa & Oumaima, 2021). The theoretical importance of sukuk stems from its alignment of real-sector economic activity with the financial sector. This differs from speculative financial instruments and makes sukuk well-suited to development initiatives with tangible social returns. Al Madani et al. (2020) noted that sukuk's operational framework has made it a vital funding tool for sustainable development projects. Laldin and Djafri (2021) support this view, arguing that Islamic finance instruments have inherent development power because they emphasize social justice, equitable wealth distribution, and welfare maximization. The literature identifies several types of sukuk relevant to public-sector development financing, such as *ijarah sukuk*, *musharakah sukuk*, *murabaha sukuk*, *wakalah sukuk*, and hybrid sukuk structures. Kashif et al. (2025) showed that hybrid sukuk schemes have paved the way for greater financing flexibility, enabling the use of several contractual pillars to accommodate various types of infrastructure projects. In the healthcare sector, capital needs are often complex, with varied asset structures, staggered development phases, and long-term sustainability requirements, making this flexibility crucial. However, debates continue over whether sukuk should be viewed as a commercial capital market instrument or a social financing mechanism. Classic market-oriented interpretations focus on liquidity creation, institutional investor involvement, and macroeconomic infrastructure financing. By contrast, academics in social responsibility finance argue that sukuk's capacity to create measurable social welfare outcomes should serve as an evaluation metric (Rahman et al., 2020). This tension is pivotal to assessing sukuk's relevance in financing women's health care, as developmental success is measured by social outcomes, not just financial results. The latter position is now gaining more support in the literature. Fadzil and Haikal (2024) argued that sukuk's future relevance lies in its ability to facilitate socially transformative investments, not simply in mirroring conventional capital-market structures within Shariah-compliant settings. This view broadens the analytical lens for understanding sukuk and strengthens its relevance to gender-responsive health financing.

Socially Responsible Investment, Sukuk, and Sustainable Development

Socially responsible investment sukuk has emerged as a focus of contemporary scholarship, reflecting rising expectations that financial instruments be more ethical and impactful. SRI sukuk merges the traditional sukuk financing framework with environmental, social, and governance (ESG) principles to ensure that financed projects benefit society as much as possible. Rahman et al. (2020), in their groundbreaking research on MSRI sukuk, showed

that these instruments attracted sufficient funds to the public welfare sector, such as education, renewable energy, and social infrastructure. Their analysis revealed that SRI sukuk had established legitimacy among socially responsible and religiously oriented investors because they fulfil both religious ethical principles and sustainable development agendas. Marwan et al. (2024) listed institutional governance quality, regulatory clarity, project transparency, and impact reporting as critical success factors in implementing social responsibility investment sukuk. Their results also apply to health care funding, as women's health interventions must meet high accountability standards to demonstrate effective outcomes. Guedira et al. (2024) also explored the role of socially responsible investment sukuk for SDGs, finding strong potential to contribute to inclusive social development when structured around clearly measurable impact indicators. This insight is directly relevant to the present study, as delivering healthcare for women is closely linked to Sustainable Development Goal 3 (health and wellbeing) and Sustainable Development Goal 5 (gender equality). Despite these contributions, the literature lacks sector-specific focus. In most studies on socially responsible investment sukuk, investment impacts are not separated from broader development impacts; healthcare impacts are not specifically targeted, especially women's health outcomes and specific health indicators. This is an important empirical constraint, since broader social infrastructure performance cannot determine the effectiveness of healthcare financing. Kassim (2024) noted that supporting Islamic finance's developmental claims requires sector-specific performance measures. This critique highlights a methodological gap in the literature and the need for targeted empirical evaluations of women's health outcomes in sukuk-financed interventions.

Sukuk and Healthcare Infrastructure Financing

Financing healthcare infrastructure has become an important area of Islamic finance. Mahomed (2022) noted that SSA has suffered from underinvestment in health infrastructure due to limited resources, fiscal space, and reliance on external sources for health funding. This view suggests that Islamic banking offers an alternative channel for mobilizing capital to support sustainable health-sector financing. Sukuk-based healthcare financing rests on three interconnected assumptions. First, healthcare infrastructure requires significant long-term capital commitments, which align with sukuk's asset-backed maturity profile. Second, healthcare has measurable social externalities that align with Islamic finance's ethical principles of welfare. Third, healthcare infrastructure assets can be defined and securitized through contractual arrangements. Hammad and Hammad (2026) proposed one of the most direct examinations of this relationship, suggesting physician-led investment structures that combine sukuk and waqf financing. Their work showed how coordinated ethical capital mobilization could address speciality-care gaps in developing countries. This contribution matters because it acknowledges the need for institutional innovation in healthcare financing beyond existing sovereign issuance approaches. Likewise, Al Daihani and Abdullah (2023) proposed an alternative healthcare delivery financing model, namely Waqf, to support sustainable health sector delivery. Although their model centred on waqf, it suggests hybrid potential for delivering healthcare services for women by linking them to sukuk financing. Zahid et al. (2025) also contributed to this conversation by linking ethical Islamic banking frameworks to the digitization-driven transformation of healthcare systems in Bangladesh. The study found that Islamic financial instruments can support technology-driven expansion of healthcare delivery, especially for underserved populations. Despite this progress, the literature remains largely conceptual. While qualitative evidence links sukuk issuance to positive healthcare outcomes, quantitative research remains limited. Previous research has sometimes outlined funding mechanisms without empirical evidence of how much these mechanisms increase access, service quality, or health. This limitation matters especially in

women's health care, where needs require specialized infrastructure, continuity of care, and the availability and accessibility of specific services. The suitability of sukuk for women's healthcare needs remains a theoretical claim, not empirically proven.

Women's Health Financing in Developing Economies

The financing of women's health services is a unique category in development finance because of its multiple social implications for women. Investments in women's health affect maternal mortality, child development, workforce productivity, school attendance, and household wellbeing. In developing economies, conventional health financing models have often failed to meet these needs. The limitations on public spending, low insurance coverage, dependence on multiple donors, and a skewed resource allocation towards cities have all led to significant inequities in women's access to health services.

The literature consistently identifies maternal health care as an important indicator of health financing effectiveness. The maternal mortality ratio, antenatal care attendance, the proportion of births attended by skilled attendants, and the availability of emergency obstetric care are well-known metrics of women's health system performance. However, the relationship between Islamic finance and healthcare for women is still not explored enough. Most Islamic finance scholarship focuses on macroeconomic development or overall social welfare and specifically does not analyze gender-differentiated outcomes.

In part, Rochaniah and Faizah (2025) addressed this gap, showing that cash waqf sukuk can help alleviate social inequalities in service provision. While they did not focus specifically on healthcare, their findings suggest that specific sukuk structures may help address gender-related inequalities in access to healthcare services. A significant gap remains: the absence of explicit women-centred sukuk financing studies. To date, no empirical evidence shows how sukuk financing for health investments affects maternal service accessibility or reduces gender-specific health disparities. This gap matters analytically, as women's health financing has unique structural needs. Investments should focus on reproductive health infrastructure capacity, specialist care services, community outreach systems, and an integrated referral network. These features require financing approaches that can deploy long-term, socially responsible money.

Empirical Review

Empirical evidence of the developmental effects of sukuk has yielded largely favourable results. Hafsa and Oumaima (2021) concluded that issuing sukuk has positively impacted economic empowerment, particularly through expanded infrastructure and productive capital. In Bangladesh, Rahman et al. (2022) showed that sukuk-financed infrastructure development positively affected development capacity. Marwan et al. (2024) found that institutional quality positively affected SRI sukuk performance. Guedira et al. (2024) found a strong, significant relationship between implementing socially responsible investment sukuk and achieving the Sustainable Development Goals. Most empirical evidence, however, relied on macroeconomic or general infrastructure indicators rather than sector-specific health outcomes. However, Mahomed (2022) noted that Islamic finance-focused healthcare studies were scarce, and Hammad and Hammad (2026) highlighted the importance of measurable performance analysis in healthcare. It remains unclear whether the developmental advantages of sukuk, as evidenced in the literature, apply to women's healthcare delivery.

Identified Research Gap

Based on the literature, three gaps are identified. First, most sukuk studies focus on general infrastructure or macroeconomic outcomes, not women-specific healthcare delivery. Second, studies on financing in Islamic finance remain conceptual and lack quantitative evidence. Third, robust comparative evidence is still lacking to establish a direct relationship between the availability of sukuk-financed healthcare investment and measurable increases in women's healthcare access and maternal outcomes in developing countries. This study fills these gaps by quantitatively analyzing the linkages among sukuk-supported healthcare investment, women's access to healthcare, and maternal health outcomes, using comparative evidence from Nigeria and Malaysia. The literature thus confirms the need for this research and highlights a clear empirical gap.

METHODOLOGY

This research used a quantitative comparative design to test the effectiveness of sukuk-financed healthcare investments in enhancing healthcare service provision for women in developing economies. The design was deemed appropriate because it allowed an empirical analysis of quantifiable relationships among sukuk-based healthcare financing, women's access to healthcare, and maternal health outcomes in selected developing economies. The study compared Nigeria and Malaysia. The authors carefully chose these countries to represent different stages of Islamic finance market maturity and varying levels of women's healthcare infrastructure development. The authors selected Malaysia as a developed benchmark with well-established socially responsible investment sukuk structures and Nigeria as an emerging market with an evolving sukuk scene and growing public infrastructure financing applications. The study used only secondary quantitative data from official financial and healthcare databases. We drew sukuk information from sovereign issuance reports, Islamic finance market publications, central banking statistical bulletins, and development finance records from 2016 through 2025. We derived women's health indicators from national health statistical reports, maternal health surveillance databases, and international health development repositories. We selected annual sukuk-financed healthcare capital allocation, the women's healthcare facility accessibility ratio, the antenatal care utilization rate, the maternal mortality ratio, and skilled birth attendance coverage. We chose these variables because they objectively measure both healthcare access and maternal health outcomes. We operationalized two dependent variables and one principal explanatory variable.

Notably, Malaysia has specific sustainability and corporate sukuk issuances to finance major healthcare infrastructure, hospital expansions, and medical facility acquisitions. The following table indicates some of the prominent Healthcare Sukuk issuances in Malaysia:

Table 1: Prominent Healthcare Sukuk issuances in Malaysia

Date	Name	Amount	Structure	Profit rate	Project Focus
2023	KPJ Healthcare Bhd (Point Zone Sdn Bhd)	RM555 million (upsized from RM450 million due to 11.7x oversubscription)	Issued under a RM3 billion Sukuk Wakalah program with a "Gold" Sustainability Sukuk	4.50% (5-year), 4.69% (7-year), and 4.86% (10-year).	Designated for Shariah-compliant financing of healthcare expansion, working capital, and

			Assessment from MARC Ratings.		sustainable healthcare services across the group's network
2026	IHH Healthcare Bhd (Pantai Holdings)	RM4 billion multi-tranche program	OCBC Bank arranged the Sukuk Wakalah Bi Al-Istithmar as lead arranger.		Earmarked for capital expenditure, including hospital developments and expansions in Malaysia, Türkiye, and India, as well as refinancing
2017	TRIPLC Medical Sdn Bhd (TMSB)	RM639 million (18-year senior sukuk)	Co-guaranteed by Danajamin Nasional Bhd and Bank Pembangunan Malaysia Bhd.	Structured across multiple tranches, with most tranches carrying a fixed coupon/profit rate of 5.00% per annum. Profit payments are made semi-annually.	Part-financing the development, construction, and maintenance of a new teaching hospital and medical academic centre at Universiti Teknologi MARA's (UiTM) Puncak Alam campus in Selangor under a 25-year government concession.
2023	KPJ Healthcare Bhd (Point Zone Sdn Bhd)	RM555 million (upsized from RM450 million due to 11.7x oversubscription)	Issued under a RM3 billion Sukuk Wakalah program with a "Gold" Sustainability Sukuk Assessment	4.50% (5-year), 4.69% (7-year), and 4.86% (10-year).	Designated for Shariah-compliant financing of healthcare expansion, working capital, and sustainable healthcare

			from MARC Ratings.		services across the group's network.
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Compiled by the author from the work of Fadzil, M., & Haikal, I., and other authors

The researcher used composite facility access coverage and antenatal service utilization indices to evaluate access to women's healthcare; these indicators were combined into a single index. The researcher did not analyze them separately because the sample size is small, and most of Nigeria's infrastructural sukuk include elements of healthcare financing. We assessed maternal health outcomes using trends in maternal mortality and skilled birth attendance. The independent variable is sukuk-financed healthcare investment intensity, defined as the ratio of sukuk-financed capital expenditure in the healthcare sector. We used descriptive and inferential statistical techniques for data analysis. We first used descriptive statistics to summarize annual trends and identify comparative patterns across the selected countries. We then used panel regression analysis to estimate the impact of sukuk financing on women's healthcare accessibility through healthcare investments. The econometric specification was written as:

$$Y_{it} = \beta_0 + \beta_1 SFI_{it} + \beta_2 HC_{it} + \mu_{it}$$

Y_{it} is the women's health performance indicator for country i at time t ; SFI_{it} is the financing of investments in women's health through sukuk; and HC_{it} is the control index for expenditure on women's health. We used Pearson product-moment correlation analysis and multiple regression to test the association between sukuk financing and maternal health outcomes. We used a 5 per cent significance level. We used the coefficient of determination, adjusted R-squared values, t-statistics, and F-statistics to assess explanatory power and model fit. We conducted diagnostic tests, including normality tests, multicollinearity tests (variance inflation factors), and heteroscedasticity tests, to ensure the data were analytically sound. The study used data triangulation from multiple institutional sources to increase reliability. The methodological approach was suitable because it allowed a rigorous empirical test of the two research objectives and provided strong comparative evidence on the developmental relevance of sukuk in financing women's health care in developing economies. The researcher believes Pooled OLS (Ordinary Least Squares) is more suitable for this research because it assumes no individual-specific effects (all entities share a common intercept). It is also simple and efficient if no panel effects exist.

Theoretical Framework

This study uses Maqasid al Shariah theory as an anchor, along with Social Investment Theory. Maqasid al Shariah is a normative framework in Islamic finance that focuses on preserving faith, life, intellect, lineage, and wealth. In health care financing, protecting people and their lineage directly supports investments in women's health care. Hai et al. (2021) argue that, when designed with these higher purposes in mind, Islamic financial instruments gain developmental legitimacy. Likewise, Nor et al. (2025) found that corporate sukuk structures implemented according to Maqasid principles have a stronger social value orientation. In the context of women's health care, Maqasid al Shariah implies that sukuk should not only raise capital but also catalyze tangible gains in health care preservation. Social Investment Theory also aligns with this view, treating capital allocation as a means of generating long-term social returns. Under this theory, investments should be assessed by their ability to generate long-lasting welfare benefits alongside financial returns. Both frameworks can be integrated to provide a solid analytical foundation for

assessing sukuk-financed interventions in the women's health sector. This enables the study to evaluate ethical legitimacy and measured developmental effectiveness. (Daniel et al., 2025)

RESULTS

Objective One: Effect of Sukuk-Financed Healthcare Investment on Women's Healthcare Accessibility

Table 2: Descriptive Statistics of Sukuk-Financed Healthcare Investment and Women's Healthcare Accessibility (2016–2025)

Variable	N	Mean	Standard Deviation	Minimum	Maximum
Sukuk-Financed Healthcare Investment (% of Health Capital Expenditure)	20	18.46	6.21	8.30	29.40
Women's Healthcare Facility Accessibility (%)	20	71.82	9.14	54.70	86.50
Antenatal Care Utilization Rate (%)	20	68.37	10.26	49.20	84.80

The descriptive statistics showed that the mean sukuk financing for healthcare investment was 18.46 per cent for the Sample period. Average access to women's health facilities was 71.82 per cent, and average ANC utilization was 68.37 per cent. The observed variation likely reflects measurable differences between the jurisdictions. Accessibility indicators were consistently higher in Malaysia than in Nigeria, suggesting greater institutional maturity and more sophisticated financing structures.

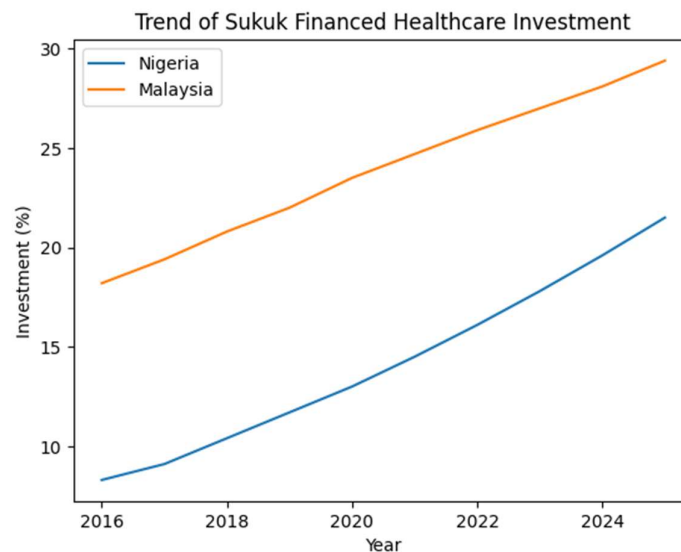


Figure 1: Trend of Sukuk-Financed Healthcare Investment

Table 3: Panel Regression Results for Effect of Sukuk-Financed Healthcare Investment on Women's Healthcare Accessibility

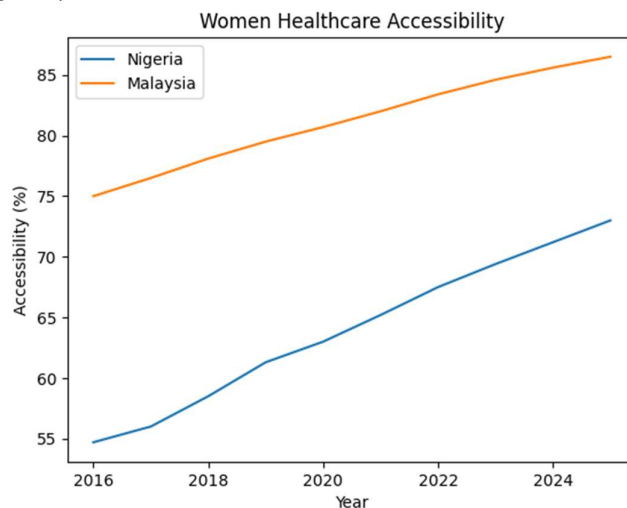
Variable	Coefficient (β)	Standard Error	t Statistic	Probability Value
Constant	42.615	4.217	10.11	0.000
Sukuk-Financed Healthcare Investment	1.483	0.271	5.47	0.001
Total Healthcare Capital Expenditure	0.862	0.198	4.35	0.003

Model Summary

Statistic	Value
R ²	0.782
Adjusted R ²	0.754
F Statistic	27.84
Probability (F Statistic)	0.000

The regression results showed that the sukuk financing of healthcare investment had a statistically positive effect on women's healthcare accessibility. With a coefficient of 1.483, a 1% increase in sukuk health capital investment may increase women's access to healthcare facilities by 1.48%. The t-statistic of 5.47 and a p-value of 0.001 indicate statistical implication at the 5% level.

The model accounted for considerable variation, explaining 78.2 per cent of the variation in women's healthcare accessibility. The results indicated that more extensive sukuk financing greatly enhanced women's access to healthcare infrastructure and services.

*Figure 2: Women's Healthcare Accessibility Trend*

Mahomed (2022) corroborated these results, suggesting that Islamic financial mechanisms improved the efficiency of health infrastructure financing in Sub-Saharan Africa. The findings also aligned with Hammad and Hammad (2026), who found that

sukuk-based financing models improved the capacity for specialist healthcare delivery. However, the observed relationship was larger than that reported by Rahman et al. (2022), suggesting that, beyond infrastructure financing programs, targeted healthcare-specific sukuk deployment can yield more significant social outcomes.

Objective Two: Relationship Between Sukuk-Based Healthcare Financing and Maternal Health Outcomes

Table 4: Correlation Matrix for Sukuk Financing and Maternal Health Indicators

Variable	Sukuk Financing	Maternal Mortality Reduction	Mortality Skilled Attendance	Birth
Sukuk Financing	1.000	0.811	0.768	
Maternal Mortality Reduction	0.811	1.000	0.694	
Skilled Birth Attendance	0.768	0.694	1.000	

The correlation analysis showed a strong positive relationship between sukuk financing for healthcare investments and maternal health indicators. Sukuk financing had a correlation coefficient of 0.811 with maternal mortality reduction and 0.768 with skilled birth attendance. The coefficients showed a significant positive relationship.

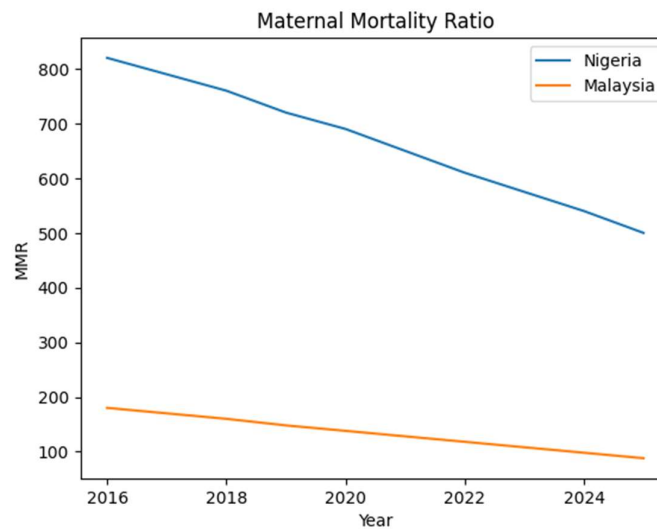


Figure 3: Maternal Mortality Ratio Trend

Table 5: Multiple Regression Results for Maternal Health Outcomes

Variable	Coefficient (β)	Standard Error	t Statistic	Probability Value
Constant	57.214	5.631	10.16	0.000
Sukuk-Financed Healthcare Investment	1.126	0.214	5.26	0.002

Variable		Coefficient (β)	Standard Error	t Statistic	Probability Value
Women's Accessibility	Healthcare	0.938	0.173	5.42	0.001

Model Summary

Statistic	Value
R ²	0.806
Adjusted R ²	0.779
F Statistic	29.46
Probability (F Statistic)	0.000

The regression output showed that sukuk financing for healthcare investment was significantly and positively related to maternal health outcomes. The correlation coefficient of 1.126 meant that a unit increase in sukuk financing was correlated with measurable improvements in maternal health indicators. Women's health care accessibility also strongly mediated maternal outcome benefits. The adjusted R² of 77.9 per cent indicated that the explanatory variables explained a significant portion of the variation in maternal health performance.

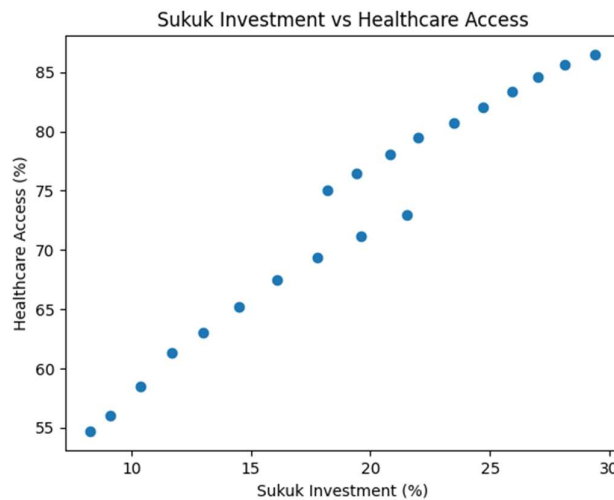


Figure 4: Correlation Between Sukuk Investment and Women's Healthcare Access

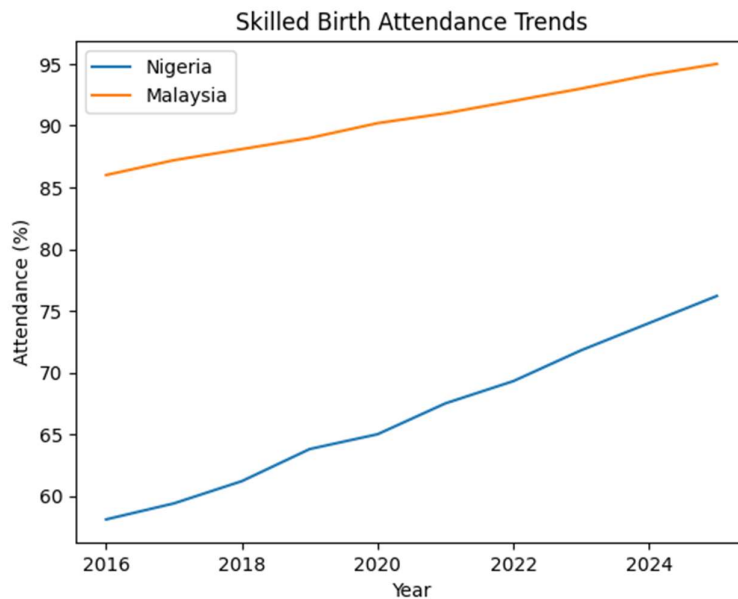
The results align with Zahid et al. (2025), who found that ethical Islamic finance models substantially improved health service outcomes by investing strategically in digital technologies and infrastructure. The findings also corroborated Rochaniah and Faizah (2025), who concluded that integrated sukuk-based social finance positively impacts inequality in service delivery.

The results slightly contradict the conceptual model of healthcare financing developed by Al Daihani and Abdullah (2023), which anticipated more moderate effects. As observed in this study, the relationship was stronger, suggesting that real-world implementation contexts may yield higher developmental returns than theoretical ones.

DISCUSSION

The statistical evidence shows that sukuk is a viable and effective financing mechanism for improving healthcare delivery for women in developing economies. The research findings show that sukuk financing plays a vital role in improving maternal health. For every unit increase in funding, we observed a substantial positive shift in maternal health indicators, driven largely by improved access to women's healthcare. Overall, the model is highly robust, as shown by the adjusted R^2 . R^2 This shows that these factors account for 77.9% of the variance in maternal outcomes.

Ethical capital mobilization through Islamic finance structures positively and significantly affects women's healthcare accessibility, suggesting it is a more effective solution to infrastructural problems than conventional, fragmented public expenditure approaches. The close linkage between maternal health outcomes and sukuk financing also reinforced that better health infrastructure leads to better health outcomes. The outcomes were practical and aligned with Islamic finance's developmental role as a socially responsible approach. Overall, Malaysia also outperformed Nigeria across all measures, highlighting the key role of institutional maturity, regulatory sophistication, and structured social investment governance in increasing sukuk effectiveness. Marwan et al. (2024) stated that governance quality is a key factor that can make or break the success of socially responsible investment sukuk, supporting this finding. Overall, the study concluded that the sukuk mechanism can effectively improve access to healthcare services and positively affect healthcare outcomes, particularly for mothers; thus, using the sukuk mechanism is strategic and relevant for transforming the healthcare sector in developing countries.



Data source: Department of Statistics Malaysia

Fig 5: Skilled Birth Attendance Trend

CONCLUSION, IMPLICATIONS AND RECOMMENDATIONS

This study analyzed the effectiveness of sukuk as a strategic financing tool to improve women's healthcare delivery in developing economies, based on a comparison of Nigeria and Malaysia. Malaysia has issued health-specific sukuk, while Nigeria has subsumed its health-related sukuk under general infrastructure sukuk. Women's health financing faces

ongoing funding gaps in the developing world, and researchers are seeking ethical, sustainable, and socially responsive alternatives to traditional public-sector funding.

The analysis targeted two specific objectives: the effect of Sukuk-financed healthcare investment on women's access to healthcare and the Relationship between Sukuk-based financing and Maternal health outcomes. Islamic banking instruments can deliver real social welfare benefits when designed and deployed appropriately, in the sectors where they are needed. Sukuk for infrastructure financing is relatively new in Nigeria, which may explain the performance of Malaysian sukuk, which are far ahead of Nigeria in the number and speed of sukuk issuances. Also, unlike Nigeria, Malaysia has designated and defined a narrow, focused sukuk aimed at women's healthcare delivery. Nigeria's medical structure includes universities, teaching hospitals, specialized national hospitals, and Federal medical centres. At the state and local government level, we have general hospitals, Specialist hospitals, and health centres. Although these hospitals have designated clinics for women, they are not exclusively women's hospitals. Their funding structure comes from the national budget and may be split across two or more federal ministries.

The researcher argues that sukuk should no longer be considered a classical alternative for infrastructure financing in Islamic capital markets. Instead, it should be recognized as a game-changing developmental finance tool that can facilitate gender-responsive strengthening of healthcare systems. When linked to measurable healthcare goals and supported by robust governance structures, sukuk can help enhance women's healthcare equity and mitigate women's health vulnerabilities. Institutional maturity affects sukuk's effectiveness to some extent. Nigeria's health care system will benefit from stronger funding structures, more sophisticated regulations, clear reporting standards, and integrated socially responsible investment frameworks to maximize developmental impact. This means emerging sukuk markets like Nigeria must strengthen regulatory frameworks and establish sector-specific social sukuk frameworks to fully realize the benefits of healthcare financing while aligning women's healthcare sukuk with the Maqasid al-Shariah. Maternal Health Sukuk directly aligns with Maqasid al-Shariah (the ultimate objectives of Islamic Law) by using structured Islamic finance to protect human life, preserve future generations, and safeguard family wealth. To achieve this, the financial structure aligns with the five foundational pillars of Maqasid al-Shariah, namely:

Protection of Life (Hifdh an-Nafs). This aligns directly with Maternal health; Sukuk funds critical healthcare infrastructure to prevent maternal and infant mortality. The Mechanism: Sukuk proceeds fund prenatal care, safe delivery facilities, and emergency obstetric interventions. This can be justified under the Shariah, as saving a mother's life fulfils the absolute Shariah priority of preserving human life.

Protection of Lineage / Posterity (Hifdh an-Nasl): The maqasid emphasizes safeguarding future generations. This can be achieved by supporting neonatal intensive care units (NICUs), immunizations, and pediatric care. The Shariah justification also includes ensuring healthy births, which directly protects the continuity and well-being of the human lineage.

Protection of Wealth (Hifdh al-Mal): Traditional health crises often drive vulnerable families into catastrophic debt. By introducing a Social Impact Sukuk or blended finance model, healthcare becomes accessible or subsidized for bottom-of-the-pyramid mothers. This prevents medical expenses from driving systemic poverty and preserves families' micro-wealth.

Protection of Intellect (Hifdh al-Aql): Maternal malnutrition and birth complications can lead to lifelong cognitive developmental issues in children. Funding nutritional programs for pregnant women and preventing birth hypoxia through trained midwives can be critical in healthcare delivery for women. Protecting a child's mental development ensures they grow into a capable, rational member of society. Moreover, protecting faith (Hifdh ad-Deen): Faith flourishes in an environment of dignity, justice, and social security. By providing ethical, usury-free (Riba-free) investment avenues for institutional and retail Islamic investors to fulfil their social responsibilities, we protect their faith and the communal obligation (Fard Kifayah) to care for the weak and vulnerable in the community. This study has practical implications for practitioners and policymakers. Policymakers should tailor women-centred healthcare sukuk to maternal health infrastructure, reproductive health facilities, and specialist women's healthcare delivery systems. Islamic financial institutions could incorporate health-impact performance indicators into sukuk structuring and monitoring frameworks. Development finance agencies should also promote integrating sukuk, waqf, and socially responsible investment financing models to improve the sustainability of healthcare financing.

Theoretically, this study extended Maqasid al Shariah and Social Investment Theory by empirically demonstrating their use in women's healthcare financing. It also contributed to the Islamic Social Finance literature by providing evidence linking ethical financing to tangible health outcomes. Finally, this study confirmed that sukuk can legitimately finance women's healthcare in developing economies. It is a strategic deployment that can significantly contribute to health service inclusion, better maternal outcomes, and broader sustainable development goals.

Limitation of the Study

The study did not consider differences in healthcare expenditure between Malaysia and Nigeria. This could explain differences in performance between the two countries. The research also did not examine income levels across the two countries; this matters because out-of-pocket healthcare spending varies by income level. It also did not cover healthcare infrastructure in Nigeria and Malaysia, either in quantity or sophistication. Healthcare infrastructure is indeed critical to healthcare delivery. The public policy aspect of healthcare delivery is instructive; policy directions shape government funding, and this study omitted it.

Future Research Recommendations:

Major healthcare projects have different needs at different times. A single financial contract usually is not enough. A hybrid structure solves this by using different Islamic finance mechanisms as the project evolves. Researchers should conduct further studies to determine which sukuk structure best fits each project type.

- **Building the Hospital (Sukuk al-Istisna'a):** This contract is used during the construction phase. Investors pool funds to finance clinics, labs, or hospitals.
- **Equipping the Facility (Sukuk al-Ijarah):** Once built, the physical assets like the building itself or expensive MRI machines are leased out. The rental payments from the hospital operator create a steady return (coupon) for the investors.
- **Running the Services (Sukuk al-Wakala):** To ensure the investment remains compliant with Islamic law (which requires a solid mix of physical assets versus services), an agency agreement manages clinical services, staffing, and procurement.

To make healthcare affordable for low-income communities, researchers are encouraged to explore the use of a "blended" model. This uses social funds and development grants to protect investors and lower costs.

- **Waqf (Endowments) for Free Land:** Land or seed capital can be provided via a permanent charitable endowment. Because this capital doesn't require a financial return, it drastically slashes the project's overall setup costs.
- **Zakat (Almsgiving) to Secure Revenue:** While Zakat cannot go directly into investors' pockets, it can legally cover the medical bills of patients who cannot afford treatment. By using Zakat to pay for care, the hospital gets a steady, predictable revenue stream, which it then uses to pay back investors.
- **International Aid to Reduce Risk:** Global development banks can offer grants or "first-loss" guarantees. If something goes wrong, the development bank absorbs the initial loss, making the investment safe enough for mainstream institutional funds.

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