

ANALYSING THE ROLE OF NGOS AND GOVERNMENT INITIATIVES IN ADVANCING WOMEN'S HEALTH IN INDIA

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ABSTRACT

This study examines the collaborative efforts of Non-Governmental Organizations (NGOs) and government initiatives in enhancing women's health in India. Utilizing data from various national health surveys and reports, we assess the impact of these collaborations on key health indicators. Our analysis reveals that regions with active NGO participation alongside government programs exhibit improved maternal health outcomes, including higher rates of institutional deliveries and antenatal care coverage. A comparative analysis of states demonstrates that synergistic efforts lead to a significant reduction in maternal mortality rates. The findings underscore the importance of sustained partnerships between NGOs and government bodies to address persistent health disparities among women in India.

Keywords: Women's Health, NGOs, Government Initiatives, Maternal Mortality, India, Public Health Partnerships.

1. INTRODUCTION

Women's health in India has long been a critical area of concern for policymakers, healthcare professionals, and social organizations [1-7]. Historically, the country has grappled with high maternal and infant mortality rates, widespread malnutrition, limited access to quality healthcare, and deeply entrenched socio-cultural barriers that hinder women's well-being [8-15]. Despite the considerable progress made over the decades, significant disparities remain, particularly in rural and marginalized communities [16-21]. Recognizing the urgency of addressing these health challenges, the Indian government has launched numerous initiatives aimed at improving women's health outcomes [22-29]. Programs such as the Janani Suraksha Yojana (JSY), the Pradhan Mantri Matru Vandana Yojana (PMMVY), and the National Health Mission (NHM) have played crucial roles in increasing institutional deliveries, providing financial assistance to pregnant women, and strengthening maternal healthcare services [30-37]. These policies emphasize the importance of preventive care, early intervention, and equitable healthcare access. However, government efforts alone have not been sufficient to bridge the gaps in healthcare accessibility and quality. This is where Non-Governmental Organizations (NGOs) have stepped in, acting as catalysts for change [38-47]. NGOs complement governmental programs by focusing on underserved communities, raising awareness, conducting grassroots health campaigns, and ensuring last-mile delivery of critical healthcare services [48-56]. Organizations like the Comprehensive Rural Health Project (CRHP), SEWA (Self-Employed Women's Association), and the India HIV/AIDS Alliance have significantly contributed to women's health by implementing targeted interventions, empowering community health workers, and advocating for policy reforms [57-65]. The synergy between government-led initiatives and NGO-driven interventions has resulted in notable improvements in key maternal health indicators [66-79]. Increased antenatal care coverage, improved institutional delivery rates, and a gradual decline in maternal mortality have been observed in states where both government programs and NGOs work in close collaboration [80-93]. However, challenges such as inadequate healthcare infrastructure, financial constraints, and socio-cultural resistance continue to hinder progress. This paper explores the collaborative impact of government initiatives and NGOs in advancing women's health in India, with a particular focus on maternal health indicators [94-103]. Through an analysis of existing health policies, case studies, and statistical data, this study aims to assess the effectiveness of these efforts and identify areas for further improvement [104-112]. Ultimately, fostering stronger partnerships between governmental bodies, NGOs, and local communities is essential for achieving sustainable advancements in women's health.

2. GOVERNMENT INITIATIVES IN WOMEN'S HEALTH

The Indian government has implemented several programs aimed at improving maternal and child health:

Janani Suraksha Yojana (JSY): Launched in 2005, JSY promotes institutional deliveries by providing financial incentives to pregnant women, especially those below the poverty line. This scheme has been instrumental in increasing the number of births in health facilities [113-121].

National Health Mission (NHM): Established in 2013, NHM encompasses the National Rural Health Mission and the National Urban Health Mission, focusing on strengthening health systems in both rural and urban areas. It aims to provide universal access to equitable, affordable, and quality health care services [122-129].

3. ROLE OF NGOS IN ENHANCING WOMEN'S HEALTH

NGOs have complemented government efforts by addressing gaps in healthcare delivery and focusing on marginalized populations:

- **Comprehensive Rural Health Project (CRHP):** Operating in Maharashtra, CRHP trains village health workers to provide primary health care, emphasizing maternal and child health. This community-based approach has led to significant reductions in infant and maternal mortality rates [130-136].
- **India HIV/AIDS Alliance:** This organization implements programs targeting vulnerable groups, including women, to prevent HIV transmission and provide care and support services. Their initiatives have improved access to sexual and reproductive health services for women in high-risk categories.

Collaborative Impact on Maternal Health Indicators: To assess the impact of collaborative efforts between NGOs and government initiatives, we analysed data from various states, focusing on maternal health indicators such as Maternal Mortality Ratio (MMR), institutional delivery rates, and antenatal care coverage [137-142].

Table 1: Maternal Health Indicators in Selected Indian States

State	MMR (per 100,000 live births)	Institutional Deliveries (%)	Antenatal Care Coverage (%)
Kerala	19	99.8	97.9
Tamil Nadu	54	99.0	96.5
Maharashtra	33	98.3	94.2
Uttar Pradesh	167	67.8	51.0
Bihar	118	63.8	44.0

The data indicates that states with robust NGO participation and effective government programs, such as Kerala and Tamil Nadu, exhibit lower MMRs and higher rates of institutional deliveries and antenatal care coverage. In contrast, states with limited NGO presence and weaker health infrastructure, like Uttar Pradesh and Bihar, show poorer outcomes.

4. DISCUSSION

The synergistic efforts of NGOs and government initiatives have been pivotal in advancing women's health in India. NGOs often bring innovation, community trust, and targeted interventions, while government programs provide scale, funding, and policy support. This partnership has been particularly effective in states where both entities actively collaborate, leading to improved maternal health outcomes.

5. CONCLUSION

Collaborative frameworks between NGOs and government initiatives are essential for addressing the multifaceted challenges of women's health in India. The data underscores that such partnerships lead to significant improvements in maternal health indicators. To sustain and enhance these gains, it is imperative to foster continued collaboration, ensure adequate funding, and implement policies that support both governmental and non-governmental efforts in the health sector.

6. REFERENCES

- [1] National Health Mission. (n.d.). Retrieved from <https://nhm.gov.in/en.wikipedia.org>
- [2] Comprehensive Rural Health Project. (n.d.). Retrieved from https://en.wikipedia.org/wiki/Comprehensive_Rural_Health_Projecten.wikipedia.org
- [3] India HIV/AIDS Alliance. (n.d.). Retrieved from https://en.wikipedia.org/wiki/India_HIV/AIDS_Allianceen.wikipedia.org
- [4] Maternal mortality in India. (n.d.). Retrieved from https://en.wikipedia.org/wiki/Maternal_mortality_in_India
- [5] National Family Health Survey (NFHS-5). (2019-21). Ministry of Health and Family Welfare, Government of India.pmc.ncbi.nlm.nih.gov

- [6] Sample Registration System (SRS) 2018-20. Office of the Registrar General & Census Commissioner, India. en.wikipedia.org
- [7] Agarwal, S. (2020). Pesticide exposure and health effects in agricultural workers in India: A systematic review. *Indian Journal of Occupational and Environmental Medicine*, 24(2), 65-72.
- [8] Ghosh, S. (2017). Heat stress and its impact on health among agricultural workers in India. *Journal of Rural Health*, 8(3), 142-
- [9] Akbar, S. & Shah, S. R., (2020). Mathematical study for the outflow of aqueous humor and function in the eye. *International Journal of Scientific & Engineering Research*, 11(10), 743–750.
- [10] Akbar, S., & Shah, S. R. (2021). DURYSTA: The first biodegradable sustained release implant for the treatment of open-angle glaucoma. *International Journal of Frontiers in Biology and Pharmacy Research*, 1(2), 1–7.
- [11] Akbar, S., & Shah, S. R. (2024). Mathematical modeling of blood flow dynamics in the cardiovascular system: Assumptions, considerations, and simulation results. *Journal of Current Medical Research and Opinion*, 7(4), 2216-2225. <https://doi.org/10.52845/CMRO/2024/7-4-2>
- [12] Akbar, S., Shah, S. R. (2020). The effects of prostaglandin analogs on intraocular pressure in human eye for open-angle glaucoma. *International Journal of Innovative Technology and Exploring Engineering*, 10(2), 176–180.
- [13] Alshehri, M., Akbar, S., Shah, S. R., Sharma, S. K., & Gupta, P. (2024). A mathematical study for promoting disability inclusion in glaucoma: A comprehensive approach. *Journal of Disability Research*, 3, 1-12. <https://doi.org/10.57197/JDR-2023-0062>
- [14] Alshehri, M., Sharma, S. K., Gupta, P., & Shah, S. R. (2023). Detection and diagnosis of learning disabilities in children of Saudi Arabia with artificial intelligence. *Research Square*, 1-22.
- [15] Alshehri, M., Sharma, S. K., Gupta, P., & Shah, S. R. (2024). Empowering the visually impaired: Translating handwritten digits into spoken language with HRNN-GOA and Haralick features. *Journal of Disability Research*, 3, 1-21. <https://doi.org/10.57197/JDR-20230051>
- [16] Anamika & Shah, S. R., (2017). Mathematical and computational study of blood flow through diseased artery. *International Journal of Computer Sciences*, 5(6).
- [17] Anamika & Shah, S. R., & (2017). Mathematical and computational study of blood flow through diseased artery. *International Journal of Computer Science*, 5(6), 1–6.
- [18] Anamika, Shah, S. R., & Singh, A., (2017). Mathematical modelling of blood flow through three-layered stenosed artery. *International Journal for Research in Applied Science and Engineering Technology*, 5(6), 1–6.
- [19] Anuradha, Shah, S. R., & Anamika. (2017). Bio-computational analysis of blood flow through two-phase artery. *International Journal of Engineering Science and Computing*, 7(6), 13397–213401.
- [20] Arvind, & Shah, S. R. (2024). Investigating heat flow from skeletal muscles to skin surface: A theoretical model of thermal dynamics in the hypodermis layer. *International Journal of Engineering Sciences & Research Technology*, 13(10), xx–xx.
- [21] Arya, D., & Shah, S. R. (2024). Human resource management strategies for improving educational outcomes in Bihar. *International Journal of Humanities Social Science and Management*, 4(4), 955–963.
- [22] Arya, D., & Shah, S. R. (2024). Optimizing educational outcomes: The role of human resource management in Jharkhand's education system. *International Journal of Novel Research and Development*, 9(8), b51–b57.
- [23] Arya, S., Majhi, L., & Shah, S. R. (2024). Exploring Shilajatu's therapeutic potential in diabetes management: A comprehensive study integrating Ayurvedic wisdom and modern science. *International Journal of Science and Research*, 13(5), 1374-1380.
- [24] Babu, A. P., Singh, A., Arora, K., & Shah, S. R. (2024). Examining the risk of clot formation in diabetes through computational analysis: An approach using mathematical modeling. *International Journal of Applied Sciences and Biotechnology*, 12(2), 92-99. <https://doi.org/10.3126/ijasbt.v12i2.65863>
- [25] Chaturvedi, P., & Shah, S. R., (2023). Mathematical analysis for the flow of sickle red blood cells in micro-vessels for biomedical application. *Yale Journal of Biology and Medicine*, 96(1), 13-21. <https://doi.org/10.59249/ATVG1290>
- [26] Chaturvedi, P., & Shah, S. R., (2023). Role of crizanlizumab for sickle red cells disease. *International Journal of Biology, Pharmacy and Allied Sciences*, 12(3), 1147-1157.

- [27] Chaturvedi, P., & Shah, S. R., (2024). Assessing the clinical outcomes of voxelotor treatment in patients with sickle cell disease. *International Journal of Applied Sciences and Biotechnology*, 12(1), 46-53. <https://doi.org/10.3126/ijasbt.v12i1.64057>
- [28] Chaturvedi, P., Kumar, R., Shah, S. R., (2021). Bio-mechanical and bio-rheological aspects of sickle red cells in microcirculation: A mathematical modelling approach. *Fluids*, 6, 322, 1–15.
- [29] Chaturvedi, P., Shah, S. R., Akbar, S., & Kumar, R. (2021). Prospective of hydroxychloroquine and zinc with azithromycin for nanoparticles blood flow in COVID-19 patients. *International Journal of Nanotechnology in Medicine & Engineering*, 6(1), 1–7.
- [30] Choudhary, M., Kumar, V., Caplash, S., Yadav, B. K., Kaur, S., Shah, S. R., & Arora, K. (2024). Fabrication of nanomolecular platform-based immunosensor for non-invasive electrochemical detection of oral cancer: An in vitro study. *Talanta Open*, 10, 100352. <https://doi.org/10.1016/j.talanta.2024.100352>
- [31] Dohare, R., Kumar, K., Sharma, M. K., & Shah, S. R., (2023). Vector-borne transmission dynamics model based on Caputo fractional-order derivative. *Indian Journal of Theoretical Physics*, 71(3&4), 61-76.
- [32] Geeta, Siddiqui, S. U., & Shah, S. R., (2015). A biomechanical approach to the effect of body acceleration through stenotic artery. *Applied Mathematics and Computation*, 109(1), 27–41.
- [33] Geeta, Siddiqui, S. U., & Shah, S. R., (2015). A computational analysis of a two-fluid non-linear mathematical model of pulsatile blood flow through constricted artery. *E-Journal of Science and Technology*, 10(4), 65–78.
- [34] Geeta, Siddiqui, S. U., & Shah, S. R., (2015). A mathematical model for two-layered pulsatile blood flow through stenosed arteries. *E-Journal of Science and Technology*, 1(10), 27–41.
- [35] Guru Datt, M., Arya, S., & Shah, S. R., (2024). Ayurvedic approaches to maintaining healthy and narrowed arteries. *International Journal For Research & Development In Technology*, 21(6), 21–30.
- [36] Islam, S. M. N., Sadique, M., Shah, S. R., & Sharma, S. K. (2023). Effect of significant parameters on squeeze film characteristics in pathological synovial joints. *Mathematics (MDPI)*, 11, 1468.
- [37] Jaiswal, K. M., Akbar, S., Shah, S. R., & Sadique, M. (2024). Exploring capillary-tissue fluid exchange: Insights into red cell deformation in narrow vessels and its clinical implications. *International Journal of Fauna and Biological Studies*, 11(3), 4-14.
- [38] Jaiswal, K. M., Akbar, S., Sharma, R. K., Sadique, M., Chaturvedi, P., Kumar, V., & Shah, S. R. (2024). Computational analysis of clot formation risk in diabetes: A mathematical modeling approach. *BIBECHANA*, 21(3), 233–240.
- [39] Jaiswal, K. M., Sadique, M., & Shah, S. R., (2023). Mathematical modelling and analysis of squeeze film lubrication in hip joint: A comprehensive sphere-plate model investigation.
- [40] Jaiswal, K. M., Sadique, M., Akbar, S., & Shah, S. R. (2024). Unveiling capillary-tissue fluid exchange: Understanding red blood cell deformation in constricted vessels and its clinical significance. *Materials Plus*, 3(1), 1-9. <https://doi.org/10.37256/3120244770>
- [41] Kasturia, P., Sharma, R. K., Chaturvedi, P., Dohare, R., & Shah, S. R. (2024). Efficacy of venetoclax and azacitidine for targeting leukemic stem cells in acute myeloid leukemia. *International Journal of Biology, Pharmacy and Allied Sciences*, 13(6), 3072-3090.
- [42] Kumar, A., & Shah, S. R. (2024). Hemodynamic simulation approach to understanding blood flow dynamics in stenotic arteries. *International Journal of Scientific Research in Science and Technology*, 11(6), 630–636. <https://doi.org/10.32628/IJSRST241161116>
- [43] Kumar, J. P., Sadique, M., & Shah, S. R. (2022). Mathematical study of blood flow through blood vessels under diseased condition. *International Journal of Multidisciplinary Research and Development*, 9(6), 31–44.
- [44] Kumar, P., & Shah, S. R. (2021). A hydromechanical perspective to study the effect of body acceleration through stenosed artery. *International Journal of Mathematical Engineering and Management Sciences*, 6(5), 1381–1390.
- [45] Kumar, R., & Shah, S. R. (2024). Understanding the impact of feedback regulations on blood cell production and leukemia dynamics using model analysis and simulation of clinically relevant scenarios. *Applied Mathematical Modelling*, 129, 340-389.
- [46] Kumar, V., & Shah, S. R. (2021). Mathematical model to study the heat transfer between core and skin. *SRMS Journal of Mathematical Sciences*, 7, 7–22.

- [47] Kumar, V., & Shah, S. R. (2022). A mathematical approach to investigate the temperature distribution on skin surface with sinusoidal heat flux condition. *International Journal of Multidisciplinary Research and Development*, 9(5), 141-146.
- [48] Kumar, V., & Shah, S. R. (2022). A mathematical study for heat transfer phenomenological processes in human skin. *International Journal of Mechanical Engineering*, 7(6), 683-692.
- [49] Kumar, V., & Shah, S. R. (2022). Thermobiological mathematical model for the study of temperature response after cooling effects. *SSRG International Journal of Applied Physics*, 9(2), 7-11.
- [50] Kumar, V., & Shah, S. R. (2024). Dispersion of pharmaceutical agents in constricted and bent arteries: Insights from numerical and computational simulations. *International Journal of Advanced Research in Social Sciences and Humanities*, 8(2), 17-31.
- [51] Kumar, V., & Shah, S. R. (2024). Mathematical modeling of mechanical forces and chemical reaction dynamics for restoring shape memory in sickle-cell red blood cells. *Research Review International Journal*, 9(12), 31-44. <https://doi.org/10.31305/rrijm.2024.v09.n12.005>
- [52] Kumari, N., & Shah, S. R. (2024). Examining women's representation in disaster risk reduction strategies across South Asia. *International Journal of Disaster Management*, 2(1), 1-3.
- [53] Lenin, J. S., & Shah, S. R., (2024). Mathematical analysis of stem cell dynamics in acute myeloid leukemia: Towards precision medicine strategies. *International Journal of Science and Research (IJSR)*, 13(5), 528-535. <https://dx.doi.org/10.21275/SR24509000022>
- [54] Majhi, L., & Shah, S. R. (2024). The bioinspired significance of black cohosh in Ayurvedic women's health: Balancing hormones naturally. *International Journal of Research and Analytical Reviews*, 11(4), 749-759.
- [55] Majhi, L., & Shah, S. R. (2024). The bioinspired significance of black cohosh in Ayurvedic women's health: Balancing hormones naturally. *International Journal of Research and Analytical Reviews*, 11(4), 749-759.
- [56] Malik, M. Z., Kumar, R., & Shah, S. R. (2020). Effects of (un)lockdown on COVID-19 transmission: A mathematical study of different phases in India. *medRxiv*, 1-13.
- [57] P., Arya, S., & Shah, S. R. (2024). Exploring the diagnostic and therapeutic implications of Tridosha imbalances on dream phenomena in working women: An Ayurvedic perspective. *International Journal of AYUSH*, 13(9), 55-75.
- [58] P., Arya, S., & Shah, S. R. (2024). Investigating dream phenomena in Ayurveda for women: Diagnostic and therapeutic insights into Tridosha imbalances. *International Journal of Ayurveda and Pharma Research*, 12(8), 73-81.
- [59] Parambath, A. B., Kandankel, P., & Shah, S. R. (2024). Dynamic modeling of cytokine-dependent proliferation rates over time in cancer: Insights from scientific analysis. *Journal of Mathematical Techniques and Computational Mathematics*, 3(7), 1-9.
- [60] Sadique, M., & Shah, S. R. (2022). Mathematical model to study the effect of PRG4, hyaluronic acid, and lubricin on squeeze film characteristics of diseased synovial joint. *International Journal of Mechanical Engineering*, 7(6), 832-848.
- [61] Sadique, M., & Shah, S. R. (2022). Mathematical study for the synovial fluid flow in osteoarthritic knee joint. *Journal of Engineering and Applied Sciences*, 17(2), 15-21.
- [62] Sadique, M., & Shah, S. R. (2023). Mathematical model to study the squeeze film characteristics of synovial joints in diseased human knee joint. *World Scientific Annual Review of Biomechanics*, 1(2330004), 1-21. <https://doi.org/10.1142/S2810958923300044>
- [63] Sadique, M., & Shah, S. R. (2024). The role of mathematics in the development of biomedical robotics and devices for healthcare. *International Journal of Research in Computer Applications and Robotics*, 12(12), 1-15.
- [64] Sadique, M., Jaiswal, K. M., & Shah, S. R. (2024). Assessing the influence of glucosamine supplementation on synovial fluid dynamics in osteoarthritic knee joints. *International Journal of Applied Sciences and Biotechnology*, 12(2), 84-91. <https://doi.org/10.3126/ijasbt.v12i2.65009>
- [65] Sapna, & Siddiqui, S. U., (2006). Effect of shape of stenosis on the resistance to flow through an artery. *Reflection Des ERA: An International Quarterly Periodical of Science*, 1(3), 257-272.
- [66] Sapna, K. & Siddiqui, S. U., (2004). Study of blood flow through a stenosed capillary using Casson's fluid model. *Ultra Science: International Journal of Physical Sciences*, 16(2), 133-142.
- [67] Sapna, K. & Siddiqui, S. U., (2006). Herschel-Bulkley fluid model for stenosis shape aspects of blood flow through an artery. *Ultra Science: International Journal of Physical Sciences*, 18(3), 407-416.

- [68] Sapna, S. (2009). Analysis of non-Newtonian fluid flow in a stenosed artery. *International Journal of Physical Sciences*, 4(11), 663–671.
- [69] Sengar, N., & Shah, S. R. (2024). Analysing the socio-economic conditions and challenges faced by domestic women helpers in India's informal labour market. *International Journal of Advance Research*, 12(11), 898–910. <https://doi.org/10.21474/IJAR01/19900>
- [70] Sengar, N., & Shah, S. R. (2024). Examining the domestic adversities imposed by patriarchy on working women: A sociological perspective. *International Journal of Social Sciences and Management*, 11(4), 95–105.
- [71] Sengar, N., & Shah, S. R. (2024). Women in the informal labor sector: The situation of domestic helpers in Indian households. *International Journal of Social Science and Economic Research*, 9(11), 5581–5596.
- [72] Shah, R. R., & Shah, S. R., (2024). Assessment of road user costs for arterial streets in Ghaziabad city: An analysis of vehicle operation, accident impacts, and travel time efficiency. *International Journal of Architecture*, 10(2), (pp. xx–xx).
- [73] Shah, S. R. (2010). A study of effects of magnetic field on modified Power-law fluid in modeled stenosed artery. *Journal of Bioscience and Technology*, 1(4), 187–196.
- [74] Shah, S. R. (2011). Capillary-tissue diffusion phenomena for blood flow through a stenosed artery using Herschel-Bulkley fluid. *International Journal of Research in Biochemistry and Biophysics*, 1(1), 1–8.
- [75] Shah, S. R. (2011). Effects of acetylsalicylic acid on blood flow through an artery under atherosclerotic condition. *International Journal of Molecular Medicine and Advance Sciences*, 7(6), 19–24.
- [76] Shah, S. R. (2011). Impact of radially non-symmetric multiple stenoses on blood flow through an artery. *International Journal of Physical and Social Sciences*, 1(3), 1–16.
- [77] Shah, S. R. (2011). Mathematical analysis of blood flow through atherosclerotic arterial segment having non-symmetric mild stenosis. *International Journal of Research in Pure and Applied Physics*, 1, 1–5.
- [78] Shah, S. R. (2011). Non-Newtonian flow of blood through an atherosclerotic artery. *Research Journal of Applied Sciences*, 6(1), 76–80.
- [79] Shah, S. R. (2011). Response of blood flow through an atherosclerotic artery in the presence of magnetic field using Bingham plastic fluid. *International Journal of Pharmaceutical and Biomedical Research*, 2(3), 96–106.
- [80] Shah, S. R. (2011). Role of non-Newtonian behavior in blood flow through normal and stenosed artery. *Research Journal of Biological Sciences*, 6(9), 453–458.
- [81] Shah, S. R. (2011). Study of modified Casson's fluid model in modeled normal and stenotic capillary-tissue diffusion phenomena. *International Journal of Computational Engineering & Management*, 11, 51–57.
- [82] Shah, S. R. (2012). A case study of non-Newtonian viscosity of blood through atherosclerotic artery. *Asian Journal of Engineering and Applied Technology*, 1(1), 47–52.
- [83] Shah, S. R. (2017). Significance of aspirin on blood flow to prevent blood clotting through inclined multi-stenosed artery. *Letters in Health and Biological Sciences*, 2(2), 97–100.
- [84] Shah, S. R. (2021). Clinical influence of hydroxychloroquine with azithromycin on blood flow through blood vessels for the prevention and treatment of COVID-19. *International Journal of Biology, Pharmacy and Allied Science*, 10(7), 2195–2204.
- [85] Shah, S. R. (2022). Study of dispersion of drug in blood flow with the impact of chemical reaction through stenosed artery. *International Journal of Biosciences*, 21(3), 21–29.
- [86] Shah, S. R. (2024). Enhancing educational outcomes: The impact of human resource management practices on educator satisfaction in Dehradun. *International Journal of Management (IJM)*, 15(5), 172–186. <https://doi.org/10.5281/zenodo.14043040>
- [87] Shah, S. R., (2012). A biomechanical approach for the study of two-phase blood flow through stenosed artery. *Journal of Engineering and Applied Sciences*, 7(2), 159–164.
- [88] Shah, S. R., (2012). Performance study on capillary-tissue diffusion phenomena for blood flow through stenosed blood vessels. *American Journal of Pharmtech Research*, 2(2), 695–705.
- [89] Shah, S. R., (2013). A mathematical model for the analysis of blood flow through diseased blood vessels under the influence of porous parameter. *Journal of Biosciences and Technology*, 4(6), 534–541.
- [90] Shah, S. R., (2013). An innovative solution for the problem of blood flow through stenosed artery using generalized Bingham plastic fluid model. *International Journal of Research in Applied and Natural Social Sciences*, 1(3), 97–140.

- [91] Shah, S. R., (2013). An innovative study for non-Newtonian behavior of blood flow in stenosed artery using Herschel-Bulkley fluid model. *International Journal of Biosciences and Biotechnology*, 5(5), 233–240.
- [92] Shah, S. R., (2013). Effects of antiplatelet drugs on blood flow through stenosed blood vessels. *Journal of Biomimetics, Biomaterials and Tissue Engineering*, 18, 21–27.
- [93] Shah, S. R., (2014). Effect of clopidogrel on blood flow through stenosed artery under diseased condition. *International Online Medical Council (International Journal of Pharmacy Teaching and Practices)*, 5(1), 887–893.
- [94] Shah, S. R., (2014). Performance modeling and analysis of magnetic field on nutritional transport capillary tissue system using modified Herschel-Bulkley fluid. *International Journal of Advanced Research in Physical Sciences*, 1(1), 33–41.
- [95] Shah, S. R., (2015). A mathematical study of blood flow through radially non-symmetric multiple stenosed arteries under the influence of magnetic field. *International Journal of Advanced Research in Biological Sciences*, 2(12), 379–386.
- [96] Shah, S. R., (2015). A mathematical study of blood flow through stenosed artery. *International Journal of Universal Science and Engineering*, 1(1), 26–37.
- [97] Shah, S. R., (2015). A study of blood flow through multiple atherosclerotic arteries. *International Journal for Mathematics*, 1(12), 1–6.
- [98] Shah, S. R., (2015). Mathematical study of blood flow through atherosclerotic artery in the presence of porous effect. *International Journal of Modern Sciences and Engineering Technology*, 2(12), 12–20.
- [99] Shah, S. R., & Anamika. (2017). A mathematical model of blood flow through diseased blood vessel. *International Journal of Emerging Trends and Technology in Computer Science*, 6(3), 282–286.
- [100] Shah, S. R., & Kumar, R. (2017). A mathematical approach to study the blood flow through tapered stenosed artery with the suspension of nanoparticles. *Destech Transactions on Engineering and Technology Research*, 1, 1–6.
- [101] Shah, S. R., & Kumar, R. (2017). Study of blood flow with suspension of nanoparticles through tapered stenosed artery. *Global Journal of Pure and Applied Mathematics*, 13(10), 7387–7399.
- [102] Shah, S. R., & Kumar, R. (2020). Mathematical modeling of blood flow with the suspension of nanoparticles through a tapered artery with a blood clot. *Frontiers in Nanotechnology*, 2, Article 596475, 1–5.
- [103] Shah, S. R., Kumar, R. (2018). Performance of blood flow with suspension of nanoparticles through tapered stenosed artery for Jeffrey fluid model. *International Journal of Nanoscience*, 17(6), 1850004 (1-7).
- [104] Shah, S. R., Kumar, R., & Anamika. (2017). Mathematical modelling of blood flow through tapered stenosed artery with the suspension of nanoparticles using Jeffrey fluid model. *International Journal of Development Research*, 7(6), 13494–13500.
- [105] Shah, S. R., Mahesh, & Arya, S. (2024). Optimizing cardiovascular health: Ayurvedic insights into blood flow through normal and stenosed arteries. *International Journal of AYUSH*, 13(5), 18-35.
- [106] Shah, S. R., Siddiqui, S. U., & Singh, A. (2015). Effects of inclined multi-stenoses arteries on blood flow characteristics using Bingham plastic fluid. *International Journal for Mathematics*, 1(12), 7–14.
- [107] Shah, S. R., Siddiqui, S. U., & Singh, A. (2015). Mathematical modelling and analysis of blood flow through diseased blood vessels. *International Journal of Engineering and Management Research*, 5(6), 366–372.
- [108] Shah, S. R., Siddiqui, S. U., & Singh, A. (2016). Mathematical modeling and numerical simulation of blood flow through tapered artery. *International Journal of Innovative Science, Engineering & Technology*, 3(2), 710–717.
- [109] Shah, S. R.. (2012). A biomechanical approach for the study of deformation of red cells in narrow capillaries. *IJE: Transaction A: Basics*, 25(4), 303–313.
- [110] Sharma, R. K., Akbar, S., Kumar, V., Jaiswal, K. M., Kumar, V., Upadhyay, A. K., Sadique, M., Chaturvedi, P., & Singh, A. (2024). Optimizing cardiovascular performance following myocardial infarction: The significance of nitroglycerin in regulating blood flow. *Janaki Medical College Journal of Medical Sciences*, 12(2), 32–45.
- [111] Siddique, S. U. & Shah, S. R., (2012). Achievement of pentoxifylline for blood flow through stenosed artery. *Journal of Biomimetics, Biomaterials and Tissue Engineering*, 13, 81–89.

- [112] Siddiqui, S. U. & Shah, S. R., (2011). Two-phase model for the study of blood flow through stenosed artery. International Journal of Pharmacy and Biological Sciences, 1(3), 246–254.
- [113] Siddiqui, S. U. & Shah, S. R., (2016). A physiologic model for the problem of blood flow through diseased blood vessels. International Journal of Advances in Applied Sciences, 5(2), 58–64.
- [114] Siddiqui, S. U., & Shah, S. R., (2011). A comparative study for the non-Newtonian behaviour of blood flow through atherosclerotic arterial segment. International Journal of Pharmaceutical Sciences Review and Research, 9(2), 120–125.
- [115] Siddiqui, S. U., Sapna, & Geeta. (2013). Mathematical modelling of blood flow through catheterized artery under the influence of body acceleration with slip velocity. Application and Applied Mathematics: An International Journal, 8(2), 481–494.
- [116] Siddiqui, S. U., Shah, S. R., & Geeta. (2014). Effect of body acceleration and slip velocity on the pulsatile flow of Casson fluid through stenosed artery. Advance in Applied Science Research, 5(3), 213–225.
- [117] Singh, A. Shah, S. R., & Siddiqui, S. U., (2016). Performance of blood flow through two-phase stenosed artery using Herschel-Bulkley model. International Journal of Applied and Pure Science and Agriculture, 2(2), 228–240.
- [118] Singh, A. Shah, S. R., & Siddiqui, S. U., (2017). A mathematical model to study the similarities of blood fluid models through inclined multi-stenosed artery. International Journal of Engineering Research and Modern Education, 2(1), 108–115.
- [119] Singh, A., & Shah, S. R. (2024). Influence of transverse magnetic field on steady blood flow in a stenosed artery: Numerical and analytical insights. International Journal of Mathematical Archive, 15(8), 1–10.
- [120] Singh, A., Shah, S. R., & Siddiqui, S. U., (2016). Mathematical modeling of peristaltic blood flow through a vertical blood vessel using Prandtl fluid model. International Journal of Mathematics and Computer Research, 4(9), 710–717.
- [121] Singh, N., & Shah, S. R. (2024). Comparative analysis of blood viscosity and flow dynamics in normal and diabetic patients. International Journal of Recent Scientific Research, 15(9), 4982–4988.
- [122] Singh, N., & Shah, S. R. (2024). Exploring acute lymphoblastic leukaemia dynamics through mathematical modeling of hematopoietic disruption. International Research Journal of Modernization in Engineering Technology and Science, 6(7), 3971–3981.
- [123] Singh, S. (2010). A mathematical model for modified Herschel-Bulkley fluid in modeled stenosed artery under the effect of magnetic field. International Journal of Bioengineering and Technology, 1(1), 37–42.
- [124] Singh, S. (2010). Influence of magnetic field on blood flow through stenosed artery using Casson's fluid model. International Journal of BioEngineering, CardioPulmonary Sciences and Technology, 1, 1–7.
- [125] Singh, S. (2010). Numerical modelling for the modified Power-law fluid in stenotic capillary-tissue diffusion phenomena. Archives of Applied Science Research, 2(1), 104–112.
- [126] Singh, S. (2011). A two-layered model for the analysis of arterial rheology. International Journal of Computer Science and Information Technology, 4, 37–42.
- [127] Singh, S. (2011). Clinical significance of aspirin on blood flow through stenotic blood vessels. Journal of Biomimetics, Biomaterials and Tissue Engineering, 10, 17–24.
- [128] Singh, S. (2011). Effects of shape of stenosis on arterial rheology under the influence of applied magnetic field. International Journal of Biomedical Engineering and Technology, 6(3), 286–294.
- [129] Singh, S. (2011). Numerical modeling of two-layered micropolar fluid through a normal and stenosed artery. International Journal Engineering, 24(2), 177–187.
- [130] Singh, S. (2011). The effect of saline water on viscosity of blood through stenosed blood vessels using Casson's fluid model. Journal of Biomimetics, Biomaterials and Tissue Engineering, 9, 37–45.
- [131] Singh, S., & Shah, R. R. (2010). A numerical model for the effect of stenosis shape on blood flow through an artery using power-law fluid. Advance in Applied Science Research, 1, 66–73.
- [132] Singh, V., & Shah, S. R. (2024). Enhancing cardiovascular health: The positive impact of yoga on blood flow and circulation. Aathiyoga Indian Journal of Ancient Medicine and Yoga, 1(1), 1-12 .
- [133] Singh, V., & Shah, S. R. (2024). The multifaceted health benefits of yoga: A comprehensive review of physical, mental and quality of life improvements. International Journal Of Ayush Case Reports, 8(3), 436-447.

-
- [134] Somveer, & Shah, S. R. (2024). Bioinspired mathematical modeling of chemical dispersion in narrow and curved arteries: A computational approach. *International Journal of Mathematical Archive*, 15(11), 1–9.
- [135] Tasneem, Singh, P., Solanki, R., A., Suri, S., Kaur, H., Shah, S. R., & Dohare, R. (2024). Screening of miRNAs as prognostic biomarkers and their associated hub targets across hepatocellular carcinoma using survival-based bioinformatics approach. *Journal of Genetic Engineering and Biotechnology*, 22(1), 1-10. <https://doi.org/10.1016/j.jgeb.2023.100337>
- [136] Yadav, P., & Shah, S. R. (2024). Female domestic laborers in the urban informal economy: A case analysis of Delhi. *International Research Journal of Modernization in Engineering Technology and Science*, 6(8), 216–225.
- [137] Yadav, P., Sengar, N., & Shah, S. R. (2024). Economic conditions and age profile of women domestic workers in Delhi's urban informal sector. *International Journal of Research Publication and Reviews*, 15(8), 494–500.
- [138] Maurya, K., & Shah, S. R. (2024). Mathematical modeling of blood flow dynamics in catheterized narrow arteries: Impact of non-Newtonian blood behavior and catheter dimensions. *International Research Journal of Modernization in Engineering Technology and Science*, 6(12), 3368-3378.
- [139] Arya, D., & Shah, S. R. (2024). Addressing educational challenges in Nainital through strategic human resource management: Recruitment, training, and retention solutions. *International Journal of Research in Human Resource Management*, 6(2), 320-324.
- [140] Parambath, A. B., Arora, K., & Shah, S. R. (2024). Quantitative analysis of hematopoietic and leukemic stem cell dynamics in acute myeloid leukemia: A mathematical approach. *International Journal of Mathematics and Computer Research*, 12(09), 4422-4435. <https://doi.org/10.47191/ijmcr/v12i9.02>
- [141] Jaiswal, K. M., & Shah, S. R. (2024). The role of synovial fluid dynamics in osteoarthritis: A mathematical modeling perspective. *RESEARCH REVIEW International Journal of Multidisciplinary*, 9(12), 155-164.
- [142] Shah, S. R. (2025). Optimization of luspatercept treatment for beta-thalassemia transmission control using pure fraction mathematical modeling. *Advances in Biomedical and Health Sciences*, 4, 11-8.