

Title: Bioprinting in cardiovascular medicine: possibilities, challenges, and future perspectives for low and middle-income countries

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Abstract: Cardiovascular diseases stemming from various factors significantly impact the quality of life and are prevalent with high mortality rates in both developed and developing countries. In cases where pharmacotherapy proves insufficient and end-stage disease ensues, a heart transplant/surgical repair becomes the only feasible treatment option. However, challenges such as a limited supply of heart donors, complications associated with rejection, and issues related to medication compliance introduce an additional burden to the healthcare system and adversely affect patient outcomes. The emergence of bioprinting has facilitated advancements in creating structures, including ventricles, valves, and blood vessels. Notably, the development of myocardial/cardiac patches through bioprinting has offered a promising avenue for revascularizing, strengthening, and regenerating various cardiovascular structures. Employment loss in developing countries as a circumstance of disability or death can severely impact a family's well-being and means for sustainable living. Innovations by means of life sustaining treatment options can provide hope for the impoverished and help reduce disability burden on the economy of low- and middle-income countries (LMICs). Such developments can have a significant impact that can last for generations, especially in these countries. In this review, the authors delve into various types of bioprinting techniques, exploring their possibilities, challenges, and potential future applications in treating various end-stage cardiovascular conditions in LMICs.

Keywords: Bioprinting Cardiovascular diseases Cardiac patches Regenerative medicine Heart transplantation Low- and middle-income countries (LMICs) Tissue engineering Sustainable healthcare

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