FRUGAL INNOVATIONS: THE FUTURE OF AFFORDABLE HEALTH CARE

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ABSTRACT
Frugal innovations are cost-conscious innovations developed to meet the needs in resource-poor settings, without compromising quality. While there have been various innovations in the field of health care in the past decades, there is a vast difference in the distribution and utilization of these innovations between developed and developing countries. Frugal innovations can play a potential role in bridging the gap between countries and ensure affordable health care for all.

KEYWORDS:
Frugal innovations; disruptive, reverse innovation; health care; affordability

Frugal innovations (Disruptive or Reverse innovation) are cost-conscious innovations specifically developed to meet the needs of the world’s poorest people in the most resource-constrained settings without compromising effectiveness. These innovations often born out of dire needs are developed at grass-root level using home-grown or self-created technologies. Healthcare delivery system is increasingly becoming dependent on technology. Availability of health technology is inversely related to health need. There is a gross mismatch in the use of available health technologies including medical devices, between high-income and low-income countries. Globally 13% of the population account for 76% of global medical device use.

The last few decades have seen multiple innovations in health and health-related sectors which has provided new treatment possibilities in developed countries. But the utilization of these innovations in low-resource countries is not satisfactory. The possible barriers to the utilization include, absence of necessary technology in low-resource settings, due to cost issues; inaccessibility of existing technology due to constraints in cost, distribution system, human resources and unreliable energy supply; and reluctance to adopt the accessible technology due to social and cultural factors. According to World Health Organisation’s (WHO) guidelines for health care equipment donations, in sub-Saharan Africa, upto 70% of the medical equipments stands idle due to non-suitability of these equipments in low-resource settings. The solution to this problem lies in encouraging frugal innovations. The new innovations should focus on four crucial components, namely the 4 A’s - Availability, Accessibility, Appropriateness and Affordability.

There have been various frugal innovations, which have revolutionized health care in the past few decades. The following are few examples:

- Jaipur foot, a rubber prosthetic for people who have lost their leg and foot below the knee, is one of the most famous frugal technologies.
- Oral rehydration therapy (ORT), which has played a major role in reducing infant and child deaths due to diarrhoea.
- Use of oral misoprostol as a less effective alternative to oxytocin in post-partum haemorrhage, to overcome problems due to refrigeration requirements.
- Fixed-dose combinations of Anti-retroviral drugs to improve treatment coverage for Acquired Immunodeficiency Syndrome (AIDS).
- eRanger, durable rural ambulance to meet medical transport in rural Africa.
- Food fortification with Iodine and Iron to reduce the burden of these micronutrient deficiencies.
- Biofortification, to produce staple crops rich in micronutrients.
- Low cost sanitary toilets.
- Ponseti method, initially employed in Malawi, due to lack of orthopaedic surgeons is now the gold standard treatment of club foot.
- Firefly, a phototherapy device to treat neonatal jaundice is under trial in Philippines and Vietnam.
- Lullaby baby warmer, developed by General Electrics’, to prevent hypothermia in neonates, provides direct heat in an open cradle.
- Low-cost bubble continuous positive airway pressure device (CPAP), developed by biomedical engineering students of Rice University, Texas.
• Shakerscope, a light source for clinical examination of eye, ear and throat, developed by two anaesthesiologists at Morriston Hospital, Swansea, United Kingdom. It provides enough electricity for 3 minutes on shaking for 30 seconds\(^1,6\).

• Smart medicine pack for Tuberculosis to ensure regular drug intake by patients, developed by Bill Thies, Microsoft Research India\(^7\)

The future of frugal science is not without challenges. For successful outcomes, the innovations should arise from work in the field. The users could play the role of co-designers.\(^2\) Better cooperation is needed between public and private sectors to improve access to affordable technologies in developing countries.\(^1\) Regulation policies are required to protect users and their ethical rights. Use of aid-budgets, cross-subsidisation and micro-insurance policies can ensure continuous implementation of frugal technologies without financial constraints.\(^1\) Future research based on frugal technologies should strive for development of rapid diagnostic tests, point-of-care tests for infectious diseases and self tests for chronic diseases; indigenous implants, stents and assistive devices; standard treatment guidelines algorithm specific for various levels to enable early diagnosis, early referral and reduce clinic visits and cost.\(^1\) Innovations in health-related sectors are needed for better agricultural produce, better sanitation and road safety.\(^1\) With the ubiquity of mobile telephones, m-Health has huge potential for collection of health-care information, provision of mobile diagnostic tests and encouragement of healthy behaviours.\(^1\) Concluding, frugal innovations have an enormous potential to bridge the gap in health care availability and affordability between developed and developing countries.

REFERENCES