ISSN: 2754-6691

Journal of Internal Medicine Research & Reports

SCIENTIFIC Research and Community

Opinion Article

Open Access

Role of Textiles in Clinical Research and Reports

Gokarneshan N

Formerly Professor and Head, Department of Textile Chemistry, SSM College of Engineering, Komarapalayam, Tamil Nadu, India

***Corresponding author**
Gokarneshan N, Formerly Professor and Head, Department of Textile Chemistry, SSM College of Engineering, Komarapalayam, Tamil Nadu, India.

Received: October 10, 2026; **Accepted:** October 15, 2026; **Published:** October 20, 2026

Textiles play a critical, evolving role in clinical research and healthcare reports, transitioning from passive materials to active therapeutic and diagnostic components. They are categorized into non-implantable (wound dressings, bandages), implantable (vascular grafts, sutures), extracorporeal devices (artificial organs), and healthcare/hygiene products (surgical gowns, masks).

Key Roles in Clinical Research and Reports
Infection Control (Fomite Mitigation): Research focuses on textiles as potential fomites (surfaces that transmit infection). Studies indicate that pathogens like MRSA and *C. difficile* can survive on hospital linens for weeks. Clinical reports evaluate antimicrobial treatments—such as copper oxide, silver ions, and zinc oxide—impregnated into fabrics, showing significant reductions in microbial load and healthcare-associated infections (HAIs) in intensive care units.

Advanced Wound Care: Textiles act as active biotherapeutic materials that manage wound exudates, provide a moisture-balanced environment, and promote tissue regeneration. Research into electrospun nanofiber dressings—including chitosan, silk fibroin, and alginate—shows accelerated healing of chronic, infected, or diabetic wounds compared to traditional gauze.

Smart Textiles and Health Monitoring: E-textiles (electronic textiles) are heavily researched for continuous, non-invasive, long-term monitoring of vital signs. These smart garments integrate sensors directly into clothing to track ECG, heart rate, respiration rate, skin temperature, and motion, with the potential to reduce hospital stays.

Drug Delivery Systems: Research explores using textiles for localized, sustained, or controlled drug delivery, where antimicrobial agents or medicaments (e.g., ibuprofen, amoxicillin) are released from the fabric to a wound site.

Evaluation of Laundering and Sterilization: Clinical reports frequently investigate the effectiveness of laundering procedures on the decontamination of uniforms and linens, comparing industrial and domestic laundering methods for efficiency in removing contamination.

Commonly Researched Materials
- **Natural/Regenerated Fibers:** Cotton, viscose, and chitosan (for superior absorbency and biocompatibility).
- **Synthetic/Functionalized Fibers:** Polyester (PET), polypropylene, and silver- or copper-coated fibers.
- **Natural Antimicrobials:** Studies are increasing on plant-derived agents such as neem, eucalyptus, aloe vera, and clove, used to finish fabrics.

Challenges and Future Trends
- **Durability and Washability:** Research is focused on ensuring that antimicrobial finishes remain effective after numerous industrial washing cycles.
- **Regulatory Compliance:** Medical textiles are increasingly regulated as Class II devices (e.g., by the FDA/CDC).
- **Environmental Impact:** There is a push towards eco-friendly, biodegradable antimicrobial materials.
- **Skin Toxicity:** Studies are needed to confirm the long-term safety of silver-coated textiles on sensitive skin.

In clinical research and reporting, textiles have evolved from passive barriers into active, "smart" platforms for diagnostics, therapy, and infection control. Their role is primarily centered on improving patient outcomes through advanced materials that sense physiological changes or deliver medication directly to the body.

Therapeutic Roles in Clinical Research
Clinical reports increasingly document the transition of textiles into active therapeutic devices:
- **Controlled Drug Delivery:** Textiles are used as carriers for the sustained release of drugs like antibiotics (e.g., amoxicillin) and anti-inflammatories (e.g., ibuprofen). Techniques like microencapsulation and hydrogel coatings allow these materials to act as reservoirs, releasing medication in response to stimuli like pH or temperature.
- **Advanced Wound Healing:** Research focuses on "smart" dressings that manage moisture, support tissue regeneration (using scaffolds like silk fibroin), and provide antimicrobial protection through silver or copper impregnation.
- **Rehabilitation:** Compression garments and orthotic textiles are studied for their ability to improve blood circulation and support injured tissues during recovery.

Diagnostic and Monitoring Applications
The emergence of e-textiles has shifted clinical focus toward remote, non-invasive patient monitoring:
- **Vital Sign Tracking:** Smart garments with embedded sensors can continuously track ECG, heart rate, respiratory rate, and

body temperature.

- **Biomarker Sensing:** Clinical reports explore textiles capable of monitoring sweat for glucose or lactate levels, providing a non-invasive alternative to traditional blood tests.
- **Motion Analysis:** Integrated strain sensors are used in clinical trials to evaluate human body motion for physical therapy and fall detection in elderly patients.

Role in Infection Control and Hygiene

Textiles are a major focus in clinical reports regarding **Healthcare**-Associated Infections (HAIs)

- **Fomite Identification:** Research identifies textiles (bedding, uniforms, privacy curtains) as reservoirs for pathogens like MRSA and C. difficile.
- **Antimicrobial Efficacy:** Clinical studies evaluate the effectiveness of antimicrobial-impregnated fabrics (using copper, silver, or zinc oxide) in reducing microbial load and lowering HAI rates compared to standard cotton.
- **Barrier Protection:** High-performance non-woven textiles are essential for surgical gowns and masks, acting as critical barriers against blood-borne pathogens and aerosols.

Categorization in Clinical Reports

In professional and scientific reporting, medical textiles are typically classified into four clinical categories:

- **Non-implantable:** Wound dressings, bandages, and gauzes.
- **Implantable:** Surgical sutures, vascular grafts, and artificial ligaments.
- **Extracorporeal Devices:** Artificial organs like kidneys and livers.
- **Healthcare and Hygiene:** Surgical clothing, bed linens, and protective masks.

Clinical Requirements for Medical Textiles

For a textile to be valid in a clinical setting, it must meet stringent performance and safety standards:

- **Biocompatibility:** Must not cause toxic, allergic, or inflammatory responses.
- **Sterilizability:** Must maintain physical and chemical integrity after sterilization.
- **Mechanical Integrity:** Must possess adequate strength, elasticity, and durability for its intended medical use.

Copyright: ©2026 Gokarneshan N. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.