



Advancing Science and Innovation in Healthcare Research

Health Horizons

Edited by
Debasmita Bhattacharya
Prabir Kumar Das
Samapika Das Biswas



ADVANCING SCIENCE AND INNOVATION IN HEALTHCARE RESEARCH

Health Horizons

Edited by

DEBASMITA BHATTACHARYA

*Department of Basic Science and Humanities, Institute of Engineering & Management,
University of Engineering and Management, Kolkata, West Bengal, India*

PRABIR KUMAR DAS

*Department of Basic Science and Humanities, Institute of Engineering & Management,
University of Engineering and Management, Kolkata, West Bengal, India*

SAMAPIKA DAS BISWAS

*Department of Basic Science and Humanities, Institute of Engineering & Management,
University of Engineering and Management, Kolkata, West Bengal, India*



ACADEMIC PRESS

An imprint of Elsevier
elsevier.com/books-and-journals



Academic Press is an imprint of Elsevier

125 London Wall, London EC2Y 5AS, United Kingdom
50 Hampshire Street, 5th Floor, Cambridge, MA 02139, United States

Copyright © 2025 Elsevier Inc. All rights are reserved, including those for text and data mining, AI training, and similar technologies.

Publisher's note: Elsevier takes a neutral position with respect to territorial disputes or jurisdictional claims in its published content, including in maps and institutional affiliations.

For accessibility purposes, images in electronic versions of this book are accompanied by alt text descriptions provided by Elsevier. For more information, see <https://www.elsevier.com/about/accessibility>.

No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or any information storage and retrieval system, without permission in writing from the publisher. Details on how to seek permission, further information about the Publisher's permissions policies and our arrangements with organizations such as the Copyright Clearance Center and the Copyright Licensing Agency, can be found at our website: www.elsevier.com/permissions.

This book and the individual contributions contained in it are protected under copyright by the Publisher (other than as may be noted herein).

Notices

Knowledge and best practice in this field are constantly changing. As new research and experience broaden our understanding, changes in research methods, professional practices, or medical treatment may become necessary.

Practitioners and researchers must always rely on their own experience and knowledge in evaluating and using any information, methods, compounds, or experiments described herein. In using such information or methods they should be mindful of their own safety and the safety of others, including parties for whom they have a professional responsibility.

To the fullest extent of the law, neither the Publisher nor the authors, contributors, or editors, assume any liability for any injury and/or damage to persons or property as a matter of products liability, negligence or otherwise, or from any use or operation of any methods, products, instructions, or ideas contained in the material herein.

ISBN: 978-0-443-33351-4

For Information on all Academic Press publications visit our website at
<https://www.elsevier.com/books-and-journals>

Publisher: Megan Ball
Acquisitions Editor: Linda Buschman
Editorial Project Manager: Kathy Padilla
Production Project Manager: Punithavathy Govindaradjane
Cover Designer: Miles Hitchen

Typeset by Aptara, New Delhi, India



24.5 Serum-derived exosomes 600	27. Artificial intelligence—An advanced tool supervising human health 657
24.6 Mesenchymal stem cell-derived exosomes 600	Deepa Dasgupta and Shabira Malviya
24.7 Platelet-derived exosomes 601	27.1 Introduction 657
24.8 Role of exosomes in red blood cell disorders 601	27.2 Different types of artificial intelligence in healthcare 658
24.9 Role of exosomes in hematological malignancy 603	27.3 Need of AI in healthcare 660
24.10 Coagulation disorders 605	27.4 Applications in supervising human health 660
24.11 Immune thrombocytopenia 606	27.5 AI in disease diagnosis 664
24.12 Conclusion 606	27.6 Challenges of using AI in healthcare 666
References 607	27.7 Conclusion 667
25. Modern technologies for human brain monitoring 611	References 667
Sanchita Ghosh, Ruchim Mukherjee and Bhama Gupta	28. Novel graph neural network-based algorithm for detection of pediatric brain tumors 669
25.1 Introduction 611	Biswajit Banu Mallik, Anshik Mukherjee and Avinash Gupta
25.2 Brain monitoring technologies 612	28.1 Introduction 669
25.3 Comparative study of the above-mentioned methods 621	28.2 Literature review 670
25.4 Emerging technologies 624	28.3 Methodology 671
25.5 Future trends and directions 625	28.4 Results 675
25.6 Conclusion 626	28.5 Discussions 682
References 626	28.6 Conclusion 683
26. Digital technology and its impact on health literacy and public health: A systematic literature review 629	References 684
Mitali Sen Gupta and Nivedita Mandal	29. Reshaping healthcare: Exploration of a deep-learning approach for blood cell classification 687
26.1 Introduction 629	Arunmita Das Bhattacharjee and Ankit K. Sharma
26.2 The realm and reality of health literacy 630	29.1 Introduction 687
26.3 Health literacy and public health 633	29.2 Background study 688
26.4 Digital technology and public health 634	29.3 Dataset 689
26.5 Digital technology and public health in India 635	29.4 Methodology 690
26.6 Digital technology in health care in India: Present scenario 636	29.5 Result 694
26.7 Methodology 638	29.6 Trending models 696
26.8 Results 640	29.7 Conclusion 700
26.9 Discussion 646	References 701
26.10 Limitations and scope for further research 651	Index 703
References 652	



CHAPTER

26

Digital technology and its impact on health literacy and public health: A systematic literature review

Mitali Sengupta^{a,b} and Nivedita Mandal^a

^aDepartment of Management, Institute of Engineering & Management, Kolkata, West Bengal, India ^bEastern Institute for integrated learning in management (EIILM), DN-9, Salt Lake Sector-V, Kolkata, India

26.1 Introduction

Health literacy, being a critical determinant of public health outcomes, has gained popularity, though due importance and related intervention are still far. Berkman and McCormack (2010), in their seminal work "Health literacy: what is it?" have defined it as "the degree to which individuals can obtain, process, understand, and communicate about health-related information needed to make informed health decisions." Health literacy encompasses a range of skills, including reading, numeracy, and the ability to navigate complex health systems. High levels of health literacy are associated with better health outcomes, greater adherence to medical advice, and more effective management of chronic diseases (Kickbusch, 2009; Kickbusch & Buse 2001; Nutbeam, 2008).

However, the definitions of health literacy are individual-centric, but the next layer of it engulfs the entire public health as it strongly connects with overall community health and the prevention of diseases. It is not merely an individual skill set but a broader concept that impacts societal health outcomes extensively. As we know, the higher the levels of health literacy, the better the individuals make informed decisions about their health, adhere to medical advice, and better their personal health outcomes. Moreover, when a significant portion of a community possesses high health literacy, the collective effect results in improved public health metrics, such as reduced healthcare costs, lower rates of hospital admissions, and enhanced preventive health behaviors (Kickbusch, 2001; Nutbeam, 2000). This broader connection establishes health

