



VIRTUAL EVALUATIONS OF JOINT HEALTH USING WEARABLE SENSORS IN PERSONS WITH HEMOPHILIA: THE VESPA STUDY PROTOCOL

S. Riva, R. Mahaffey

St. Marys University London, UK

Virtual Evaluations of joint health using wearable Sensors in Persons with haemophilia (VESPA) is a mixed-methods feasibility study exploring the use of wearable and video-based technologies to remotely monitor joint health and rehabilitation outcomes in adults with haemophilia. The intervention combines a home-based exercise programme with mobile motion capture technology to assess joint range of motion, pain, and quality of life over an eight-week period. Participants attend two laboratory sessions at St Mary's University, during which lower-limb joint movement is assessed using markerless motion capture systems including Sony cameras, Theia modelling software, and the Quantum Mobile App. Between these visits, participants complete weekly home exercise sessions while recording movement data using their own smartphones. The intervention is designed to evaluate whether wearable and mobile technologies can pro-

vide clinically meaningful assessments of hip, knee, and ankle function outside laboratory settings. The study integrates several assessment tools, including remote video-based movement analysis, the Haemophilia Joint Health Score, pain questionnaires, quality-of-life measures, exercise logs, and semi-structured interviews. Quantitative measures are used to evaluate joint range of motion, pain intensity, physical function, and rehabilitation adherence, while qualitative interviews explore participants' experiences, barriers, and facilitators associated with remote monitoring technologies. The intervention emphasises digital rehabilitation and remote monitoring within haemophilia care, aiming to improve accessibility and provide real-time feedback to patients and clinicians without requiring frequent hospital attendance. The study also explores the usability, acceptability, and feasibility of integrating mobile health technologies into routine rehabilitation and long-term joint health management.