Supplementary

Appendix 1 Research question

A search of the literature was conducted to address the research question "What is the current use of wearable technologies for falls-risk assessment" as shown in the PICO format below. A search strategy was created to identify relevant studies based on the research question below (set out in the PICO format):

Population	Falls-risk individuals in both neurological and non-neurological populations
Intervention	Wearable technology based gait analysis tools for fall-risk assessment
Control (Reference Clinical Tool)	Other clinical fall-risk assessment tools based on gait analysis e.g. laboratory-based 3D motion
Outcome	Successful/accurate falls-risk prediction

A search of Medline, PubMed, Scopus and Embase databases was performed in February 2020. The complete search strategy can be obtained from the attached PROSPERO registration (ID: CRD42020195861)

Included Studies:

Medline, Embase, Pubmed and Scopus were systematically searched from their date of inception to February, 2020. A manual search for other relevant articles was also conducted by examining the references and citations of key papers. Database and bibliographic search identified 662 relevant studies. After removal of duplicates, 493 studies remained. 327 references were excluded on title and abstract screen and 120 references were excluded by full-text analysis, leaving a final 46 studies to be included in qualitative synthesis (see Figure 5 for PRISMA flow chart). Reasons for exclusion during full text review include: not involving falls-risk prediction tool/model (73), not involving wearable technologies (47).

Appendix 2 Review registration

Do fallers walk funny? A systematic review of gait metrics that predict falls in high-risk populations

Callum Betteridge, Daniel Ho

To enable PROSPERO to focus on COVID-19 registrations during the 2020 pandemic, this registration record was automatically published exactly as submitted. The PROSPERO team has not checked eligibility.

Citation

Callum Betteridge, Daniel Ho. Do fallers walk funny? A systematic review of gait metrics that predict falls in high-risk populations. PROSPERO 2020 CRD42020195861 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42020195861

Review question

P: In adult patients (normal or neurogenic gait alterations) at risk of falls/with a history of falls
I: Which aspects of gait or posture change
C: Compared to adult patients without falls risk/history of falls
O: And are predictive of falls risk

Searches

MEDLINE, PubMed, EMBASE, Scopus, Search date 28/02/2020

Search strategy

https://www.crd.york.ac.uk/PROSPEROFILES/195861_STRATEGY_20200628.pdf

Types of study to be included

Cohort or case control

Condition or domain being studied

Risk of falls in adults with and without neurological disease

Participants/population

Adult fallers versus non-fallers, with or without neurological disease

Intervention(s), exposure(s)

Changed gait parameters

https://dx.doi.org/10.21037/mhealth-21-7

Comparator(s)/control

Gait parameters in non-fall patients

Main outcome(s)

Main outcome is either history of falls or prospective falls events

Measures of effect

Relative risks and odds ratios

Additional outcome(s)

None

Measures of effect

None

Data extraction (selection and coding)

Papers are cohort, with 6 or greater month follow up, or case-control studies comparing groups of age and/or disease-matched fallers and non-fallers with validated methods of gait analysis and be published after January 1st, 2015.
Data collected from articles post-screening documenting which gait variables are measured, and their effects on risk of falls. Additionally, how gait metrics and falls risk were assessed, patient numbers and broad demographics (esp whether or not there was a neurological alteration to gait)

Risk of bias (quality) assessment

Risk of bias and level of evidence for each article is assessed using the Oxford University Centre for Evidence Based Medicine (CEBM) criteria

Strategy for data synthesis

If consistent measures of falls-risk and gait metrics are used, data will be synthesised assuming that there are more than 3 studies for that gait metric.
Method will be using forest plots if this is available.

Analysis of subgroups or subsets

'Subgroups' will be defined by each gait metric, for example for gait velocity, any paper studying it will be examined and the results combined if gait velocity is measured consistently, if falls-risk is measured consistently, and if there are 3 or more applicable studies.

Contact details for further information

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Organisational affiliation of the review

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Review team members and their organisational affiliations

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Collaborators

Professor Ralph Mobbs. University of New South Wales
Mr Wen Jie Choy. University of New South Wales

Type and method of review

Diagnostic, Prognostic, Systematic review

https://dx.doi.org/10.21037/mhealth-21-7

Anticipated or actual start date

01 March 2020

Anticipated completion date

30 July 2020

Funding sources/sponsors

No funding was obtained for this review, it was performed independently

#Conflicts of interest

Language

English

Country

Australia

Stage of review

Review Ongoing

Subject index terms status

Subject indexing assigned by CRD

Subject index terms

MeSH headings have not been applied to this record

Date of registration in PROSPERO

30 July 2020

Date of first submission

28 June 2020

Stage of review at time of this submission

Stage	Started	Completed
Preliminary searches	Yes	Yes
Piloting of the study selection process	Yes	Yes
Formal screening of search results against eligibility criteria	Yes	Yes
Data extraction	No	No
Risk of bias (quality) assessment	No	No
Data analysis	No	No

The record owner confirms that the information they have supplied for this submission is accurate and complete and they understand that deliberate provision of inaccurate information or omission of data may be construed as scientific misconduct.The record owner confirms that they will update the status of the review when it is completed and will add publication details in due course.

https://dx.doi.org/10.21037/mhealth-21-7