Department of Technology, Kristiania University College

# Smart Watch for Smart Health Monitoring: A Literature Review

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Chapter I

# Research Background & Motivation

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- Digital Health: WHO defines "Electronic health (eHealth) or digital health (digital health) as the cost-effective and secure use of information and communications technologies in support of health and health-related fields, including health-care services, health surveillance, health literature, and health education, knowledge and research.

The use of information and communication technologies must be "safe, reliable, fair, and sustainable." Digital healthcare innovation should be developed based on such principles as transparency, accessibility, interoperability, confidentiality, and security, among others

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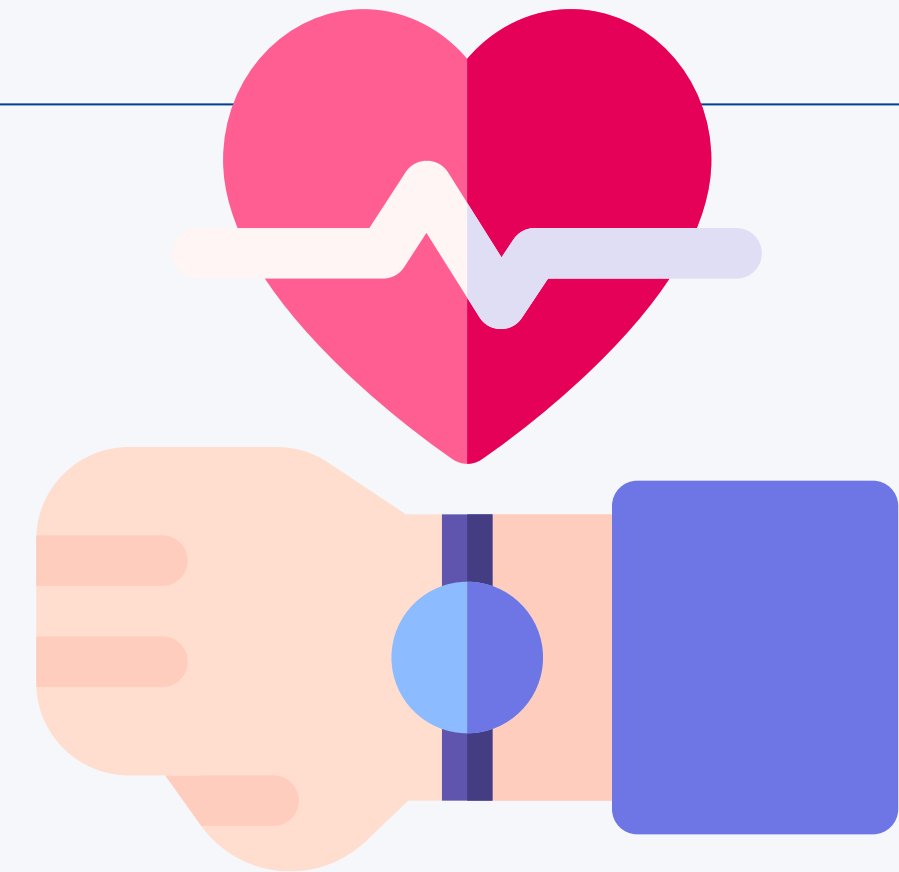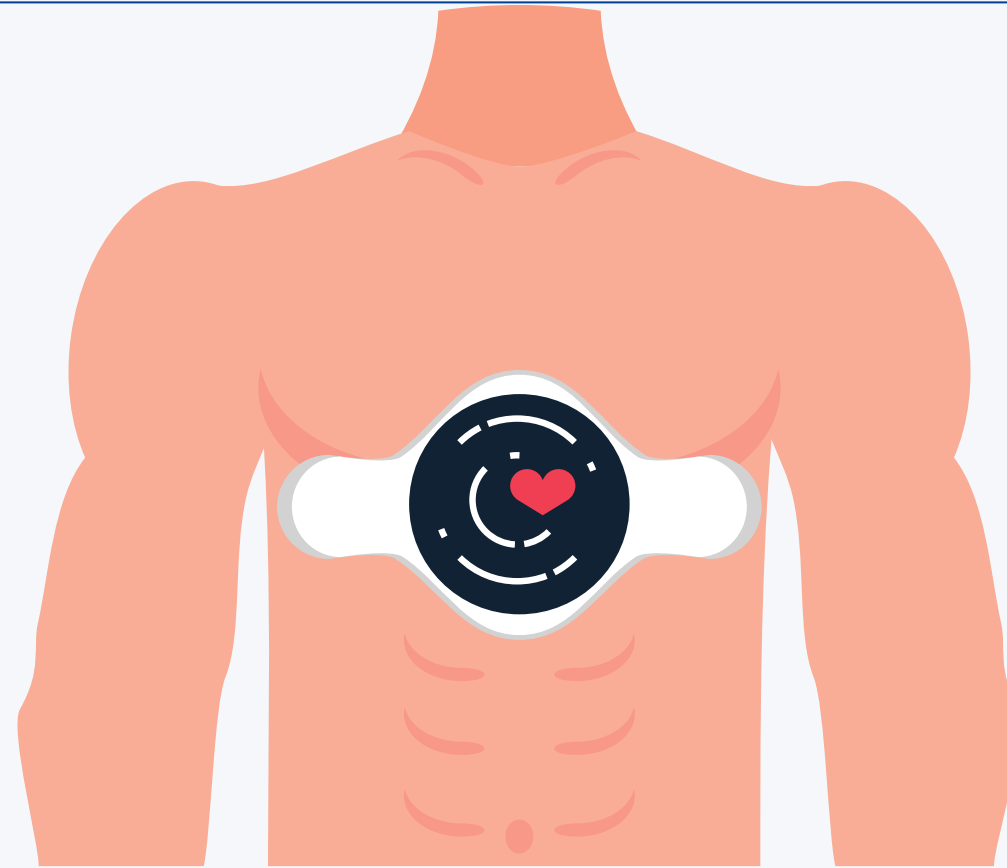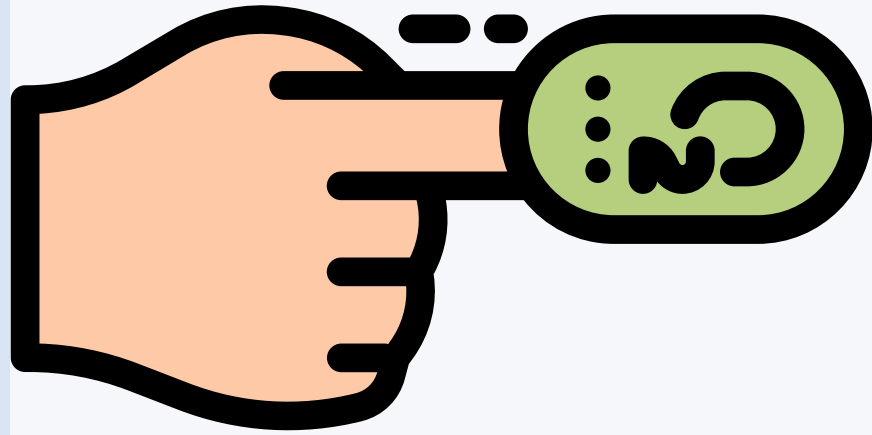
- ## Role of Wearables in Digital Health

  Wearable smartwatches can be considered a boon to healthcare technology. It provides patient monitoring, diagnosis, and assistance with treatment. It is capable of monitoring blood pressure, Oxygen saturation, heartbeats, pulse rate, sleep habits, physical activities, etc. The wrist is a convenient place to display all vital information as the arm moves several times compared to all other body parts so it is able to trace all the motions of the body also, the wrist has veins and arteries to measure pulse, and the skin is thin enough for sensors to detect blood pressure.

## Objective

In this article, we intend to survey the research work in regard to medical care utilizations of smart watches and the continuous exploration projects that have been enrolled in the public authority clinical preliminaries site. We additionally examine the expected uses and restrictions of smart watches in medical services settings.

# Research Methodology

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## PRISMA Methodology

PRISMA is an evidence-based minimum set of items for reporting in systematic reviews and meta-analyses.

# Selection Method

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## Literature Search

- Accurately figuring out the framing of a "foreground" research question using PICO (population, intervention, control, and outcomes) process.
- Fostering a convention (consideration and rejection measures).
- Execute a detailed research search.
- Screening the abstracts of the research recognized in the pursuit.

## Databases

- PubMed database
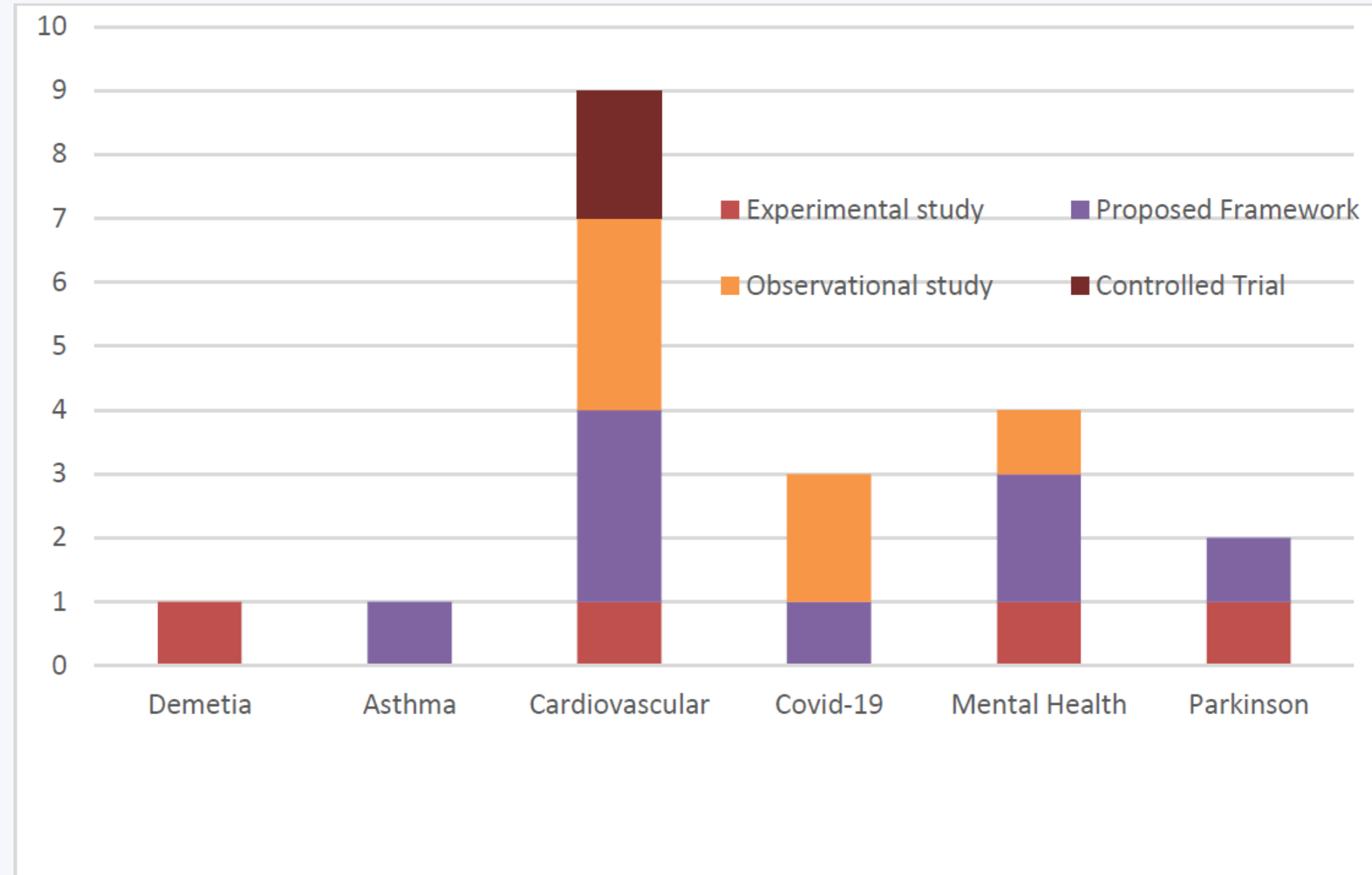
- ACM Digital Libraries

- IEEE Xplore

## Search String

- "Smart Watch; Health care" or "Smartwatch; Healthcare" alongside the brand of the smartwatches.

# Research Results

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The research works related to smartwatches in healthcare are booming with researchers working on projects ready to be deployed to users, which can be stated by the fact that the study design for most of the selected research work is a proposed framework (8, 40%). This is followed by an observational study (30%), experimental study (20%), and controlled trial(10%).

Among selected publications, there are six publications specifically targeted at old age people (30%) and three publications targeted explicitly at youngsters (15%). With the advancement of heart rate monitoring in smartwatches, most of the selected research works were focused on cardiovascular disease (9, 45%). There are four publications related to mental health (20%) and two publications associated with Parkinson's (10%).
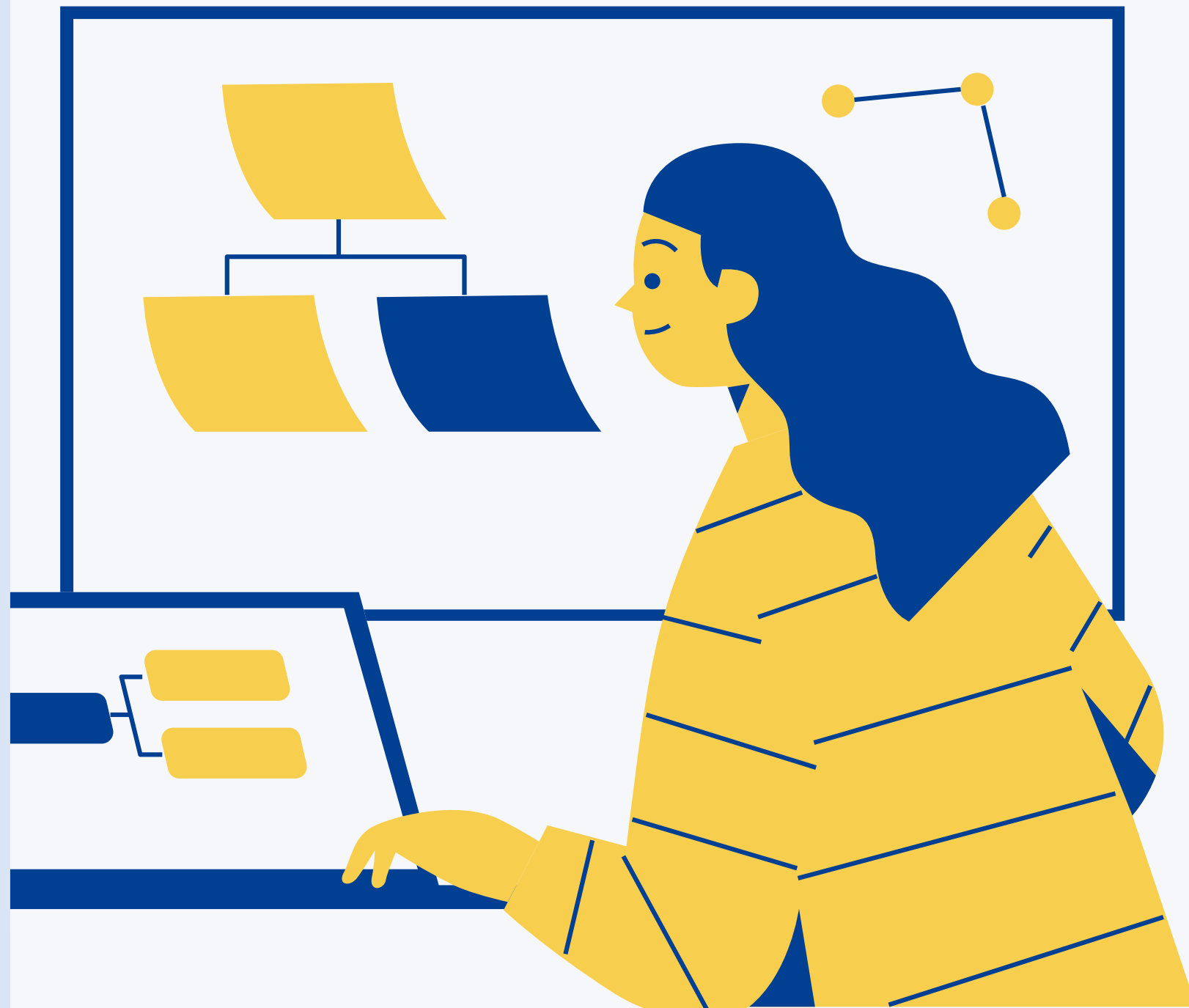
## Sensors

Electrocardiography (ECG)  (6, 30%)

Photoplethysmography sensor (PPG) (9,45%).

Oxygen saturation monitor (SpO2)  (5, 25%).

## Targeted Population

There are six publications specifically targeted at old age people (30%) and three publications targeted explicitly at youngsters (15%).

## Design

Most of the research work presented a user-centric design ready to be utilized in real-life scenarios (8, 40%) and consolidates the importance of a smartwatch in health care.

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# Conclusion & Discussions

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- Android & Apple Smartwatch - In terms of functionality, the recent release of both platforms provide a SpO2 sensor, an ECG sensor, and a GPS. GPS and heart rate observing precision of smartwatches is up there with some decent dedicated trackers. The recent series of the Apple Watch's (7) healthcare monitoring facility isn't still medical grade, so there is a scope for improvement in both apple watch and Android watches.

- Security Concerns - Most concerns around smartwatch privacy are based on the hazards of connected tech and the lack of cybersecurity standards surrounding the IoT. As more analog devices connect to the internet (and each other) — even light switches in your smart home – will require cybersecurity.

- Conclusion - Deep exploration is needed to comprehend the impact of applications on Healthcare Informatics. Generally, the smartwatch and its clinical applications stay encouraging yet doubtful. At present, the innovation has all the earmarks of being protected, fills in as promoted, and connects with patients outside of the average patient-supplier office experience.

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# Thank you for Listening!

# Any Questions?

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