How is the Quality of Patient-Generated Health Data Managed in Diabetes Remote Monitoring?

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451 million in 2017 (age 18-99 years)

552 million by 2030

USD 850 billion
Global healthcare expenditure on people with diabetes in 2017

We should bring care to patients instead of patients to care
Remote Patient Monitoring

✓ Better access to healthcare
✓ Improved quality of care
✓ Peace of mind and daily assurance
✓ Improved support, education and feedback

Evolution of Blood Glucose Monitor

First Generation
- Reflectance Meters
- Qualitative results

Second Generation
- Smaller blood volume,
- Less pain, shorter test time,
- Better accuracy/precision,
- Miniaturisation

Third Generation
- Continuous Glucose Monitoring (CGM)
- Invasive & minimally invasive

Fourth Generation
- Non-invasive monitoring

Time:
- 1970
- 1980
- 2000
- 2013

Performance

Artificial Pancreas Device System

1. Continuous Glucose Monitor
2. Computer-Controlled Algorithm
3. Insulin Pump
4. Patient Effect

https://www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/HomeHealthandConsumer/ConsumerProducts/ArtificialPancreas/ucm259548.htm
Flash Glucose Monitoring

1. Apply sensor with applicator

2. Scan sensor using FreeStyle Libre Reader

3. Get reading on the reader

https://www.freestylelibre.us
✓ Wearables used in diabetes RPM are medical-grade devices
✓ They are tested in terms of accuracy and safety
✓ Data is collected automatically
Patient Generated Health Data

- Patients, not clinicians, are primarily responsible for capturing or recording these data
- Data are collected outside the clinical setting
- Patients may choose how and with whom they can share their health data
- No guidelines exist to define PGHD management process and to ensure PGHD quality

Poor Data Quality Is One of the Main Reasons for Low Adoption of PGHD in Clinical Practices

Accessibility
Accuracy
Consistency
Interpretation
Relevancy
Timeliness
Institutional Environment
METHODS
6 Care Providers (CPs) (at 5 clinical settings)

- 2 Endocrinologists
- 4 Diabetes Educators

6 RPM Solution Providers (SPs)

- 1 CGM Manufacturer
- 2 PGHD integration Service Providers
- 3 RPM Consultants

4 Information Professionals (IPs)

- 2 Chief Information Officers
- 1 Health Informaticians
- 1 IT managers
Participants asked to:

- Describe PGHD management process
- Discuss PGHD quality challenges
RESULTS & DISCUSSION
PGHD Management Process in Diabetes Remote Monitoring
Data Quality Challenges during PGHD Management - CPs Perspectives

**Accuracy**
- Calibration
- Errors in manual data entry
- Wrong application on body

Inaccurate measuring

**Institutional Environment**
- Lack of PGHD integration with current EMR (IT infrastructures, health IT staff, guidelines)

**Accessibility**
- No access to raw data
- Difficulty in accessing different portals

**Interpretation**
- High volume of information presented

**Relevancy**
- Difficulty in prioritising relevant information

**Timeliness**
- No real-time data access

**People**

**Process**

**Technology**
Data Quality Challenges during PGHD Management - IPs

**Perspectives**

**Accessibility**
- Data access by hackers

**Consistency**
- Different devices and different data transmission standards

**Institutional Environment**
- Lack of PGHD integration with current EMR (IT infrastructures, health IT staff, guidelines)

**Accessibility**
- Difficulty in accessing different portals
Data Quality Challenges during PGHD Management

**Accuracy**
- Lack of automation in contextual data collection
- Calibration
- Lack of motivation

**Institutional Environment**
- Lack of PGHD integration with current EMR (IT infrastructures, health IT staff, guidelines)

**Consistency**
- Difficulty in realising patient’s status due to inconsistent reports

**Interpretation**
- Complicated data visualisation
- Lack of context
CONCLUSION
Need for:

- PGHD management protocols (interoperability, terminology standards, etc.)
- PGHD quality guidelines
- Digital health literacy
- Collaboration, collaboration, collaboration
THANK YOU!

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