Universidad Politécnica de Madrid

Escuela Técnica Superior de Ingenieros Informáticos

Digital Health

Review A Digital porduct: Medtronic

Authors:

José Antonio Ruiz Heredia

Teacher:

Nancy Sayre

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1 Medtronic

Medtronic is one of the world's largest medical device companies, known for its innovations in cardiac, neurological and diabetes care technologies. One of its leading products in the field of diabetes is the *MiniMed 780G* system, an advanced insulin pump that automatically adjusts insulin delivery based on *Continuous Glucose Monitoring (CGM)*.

With over 35 years of experience in diabetes technology, the company designs its solutions to help people achieve better glucose control and spend less time managing their condition. *Medtronic's* mission goes beyond technology, it aims to offer tools that reduce the daily burden of diabetes and make life easier [1].

2 The Product

The *MiniMed 780G* is an *Automated Insulin Delivery (AID)* system designed for people living with type 1 diabetes. It integrates an insulin pump, a *CGM* sensor, and a control algorithm that adjusts insulin dosing every five minutes. This technology reduces the need for constant manual insulin dosing and helps maintain blood glucose within a healthy range.

The primary users of the *MiniMed 780G* system are adolescents and adults diagnosed with type 1 diabetes, especially those who experience frequent highs and lows or who find traditional insulin management challenging [1].

3 Pros and Cons

Looking at their product, we can point out some significant pros and cons [2] [3]:

3.1 Pros

- **Improved Glucose Control:** Automatically adjusts insulin for better blood glucose management and higher time in range.
- **Reduced Mental Load:** Less manual intervention and fewer adjustments needed, easing the burden of diabetes management.
- **Extended Infusion Set Life:** 7-day infusion sets reduce the frequency of changes and failures.
- **Real-Time Feedback:** Continuous updates via the mobile app and *CareLink* platform for better tracking and management.
- **Aggressive Algorithm:** Quickly corrects high blood glucose levels, requiring minimal user input.

3.2 Cons

- **Device Size:** The large size of the pump can be uncomfortable for some users.
- **Complexity and Learning Curve:** New users may find it challenging to learn the system.
- **Sensor Limitations:** The 7-day *CGM* has a shorter lifespan compared to competitors and requires recalibration.
- **Dependence on Technology:** Reliance on algorithms may not appeal to users who prefer more hands-on control.

4 Ethical Issues

The *MiniMed 780G* system raises several ethical considerations related to healthcare accessibility and corporate responsibility. Although the technology has the potential to greatly improve the quality of life for people with diabetes, it remains inaccessible to many due to its high cost and the limited availability of insurance coverage in certain regions. This creates a gap in equitable access, particularly affecting lower-income individuals and communities in developing countries. Additionally, *Medtronic* has been fined for supplying unregistered medical devices. This raises concerns about the regulatory practices and oversight of devices that directly impact patient health.

Another ethical issue involves the collection and storage of sensitive health data by the *MiniMed 780G* and similar devices. Given that these devices track real-time glucose levels and other health metrics, there is a significant risk to patient privacy if data is not properly protected. Companies like *Medtronic* must prioritize transparent data policies and invest in robust cybersecurity measures to ensure user confidentiality and safety [4].

5 Their Future

The future for the *MiniMed 780G* and similar *AID* systems looks promising. *Medtronic* is advancing its technology by developing smaller, more user-friendly devices, extending the useful life of the sensor and improving algorithm performance. As these innovations evolve and become more affordable, global accessibility is expected to increase. In addition, the use of *Artificial Intelligence (AI)* and individualized treatment options could enhance the effectiveness of diabetes management in the future.

6 Personal Opinion

I would be interested in working for *Medtronic* in the future. The company plays a vital role in improving global health and pushes the boundaries of what medical technology can do. *Medtronic's* mission of *"alleviating pain, restoring health, and extending life"* aligns with my personal values and presents an opportunity for a fulfilling professional experience. It is a role where I could grow in my sector and contribute meaningfully to society. Concretely, I would be particularly interested in working on projects that not only advance cutting-edge medical technologies but also focus on making these innovations more affordable and accessible. However, as mentioned before, it is important to ensure the protection of user data privacy in the process.

7 Conclusion

The *MiniMed 780G* system is a significant step forward in diabetes management. It offers major benefits in health outcomes and quality of life for people with type 1 diabetes. At the same time, its cost and complexity pose barriers that need to be addressed. *Medtronic's* continued innovation and ethical responsibility will determine how impactful this product will be on a global scale.

References

[1] Medtronic. (2024). https://www.medtronicdiabetes.com

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