

# Validating Actofit Health App Accuracy Levels of CGM Data via NFC Scans

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**Abstract:** *This comparative study aims to assess the equivalence of the Actofit glucose monitoring system with Near Field Communication (NFC) scanning and the established Abbott CGM system with a dedicated reader. Continuous Glucose Monitoring (CGM) has become an essential tool in diabetes management, providing real - time glucose level data for informed decision - making. The Actofit glucose monitoring system offers the convenience of NFC scanning with a smartphone app, while the Abbott CGM system relies on a dedicated reader device. The study focuses on parameters such as accuracy, reliability, consistency, user experience, convenience, and data analytics. By objectively evaluating both systems, this study aims to expand the options available to individuals managing diabetes and assist in selecting the most suitable CGM system for effective glucose monitoring and diabetes care. The results will contribute to advancements in CGM technology and enhance the understanding of their utility in optimizing diabetes management.*

**Keywords:** Continuous Glucose Monitoring (CGM), Actofit CGM, Abbott CGM, Near Field Communication (NFC), Glucose monitoring, Diabetes management, Accuracy, Reliability, Consistency, User experience, Convenience, Data analytics, Trend analysis, Glucose readings, Smartphone app, Dedicated reader, Comparative analysis, Diabetes care, Glucose patterns, Healthcare technology.

## 1. Introduction

### Abbott CGM (Continuous Glucose Monitoring) -

The Abbott CGM (Continuous Glucose Monitoring) system, along with its dedicated reader, has emerged as a well - established and widely recognized solution for continuous glucose monitoring in individuals with diabetes. This advanced system has transformed diabetes management by providing real - time and continuous glucose level data, empowering individuals to make informed decisions about their insulin dosing, diet, and overall health. <sup>(1)</sup>

The Abbott CGM system consists of a small sensor that is applied to the back of the upper arm, allowing it to measure glucose levels in the interstitial fluid. The system's dedicated reader device plays a crucial role in retrieving the glucose readings from the sensor. By scanning the reader over the sensor, users can obtain real - time glucose readings, which are then displayed on the reader's screen. <sup>(2)</sup>

The Abbott CGM system is highly regarded for its accuracy, ease of use, and reliable glucose monitoring capabilities. Its sensor technology enables individuals to obtain frequent and precise glucose measurements, reducing the need for traditional fingerstick testing. The system also offers valuable features such as trend analysis, historical data, and customizable alarms, enabling users to identify patterns, trends, and fluctuations in their glucose levels. <sup>(2)</sup>

The dedicated reader device is specifically designed to interface with the Abbott CGM system, providing a user - friendly and intuitive experience. It allows individuals to access their glucose data easily and conveniently, facilitating effective diabetes management. The reader's display provides real - time glucose readings, trends, and historical data, empowering users to track and understand their glucose patterns over time. <sup>(2)</sup>

The Abbott CGM system, with its reliable sensor technology and dedicated reader, has significantly enhanced the

monitoring and management of diabetes. Its comprehensive features and user - friendly interface enable individuals to proactively monitor their glucose levels, make informed decisions, and improve overall glycemic control. <sup>(2)</sup>

### Actofit Health Management Company:

The Actofit glucose monitoring system, in combination with its innovative app that utilizes Near Field Communication (NFC) scanning technology, has emerged as a promising contender in the realm of continuous glucose monitoring (CGM) for individuals with diabetes. This system offers a convenient and user - friendly approach to monitor glucose levels in real - time, empowering individuals to take proactive control of their diabetes management. <sup>(3)</sup>

The Actofit glucose monitoring system incorporates a Abbott Freestyle Libre sensor applied to the user's skin, similar to other CGM systems. However, what sets it apart is the utilization of NFC scanning technology through a compatible smartphone app. By simply scanning the sensor with the smartphone equipped with the Actofit app, users can obtain instant and accurate glucose readings without the need for a dedicated reader device. <sup>(4-7)</sup>

The Actofit app, designed to seamlessly integrate with the CGM system, serves as the interface for displaying and analyzing glucose data. It utilizes NFC technology to establish a connection with the sensor, enabling the app to retrieve real - time glucose measurements and present them to the user in an intuitive and user - friendly manner. The app also incorporates additional features such as trend analysis, data analytics, and customizable settings, empowering individuals to gain valuable insights into their glucose patterns and trends. <sup>(8)</sup>

The Actofit glucose monitoring system's NFC scanning technology, coupled with its dedicated app, offers several advantages for users. Firstly, the convenience of using a smartphone for scanning eliminates the need for carrying an additional reader device, simplifying the monitoring process

and making it more accessible. Secondly, the Actofit app provides a user - friendly interface that allows individuals to effortlessly view and interpret their glucose data, aiding in making informed decisions about their diabetes management. <sup>(8)</sup>

By leveraging NFC scanning technology, the Actofit glucose monitoring system and app aim to provide accurate and real - time glucose monitoring while ensuring a seamless user experience. The system offers individuals with diabetes an alternative option that combines convenience, accuracy, and ease of use to enhance their glucose monitoring and diabetes management. <sup>(9 - 12)</sup>

## 2. Methodology

### 1) Study Design:

This comparative study aims to evaluate the equivalence of the Actofit glucose monitoring system with NFC scanning and the Abbott CGM system with a dedicated reader. The study follows a prospective observational design, comparing the performance and usability of both systems.

### 2) Participant Selection:

Participants for the study will be recruited from individuals with diabetes who are currently using or have experience with CGM systems. Informed consent will be obtained from each participant before their inclusion in the study.

### 3) Sample Size

The sample size will be determined based on power analysis and statistical considerations to ensure sufficient statistical power for detecting significant differences between the Actofit glucose monitoring system and the Abbott CGM system.

### 4) Data Collection:

- a) Glucose Readings: Participants will wear both the Actofit glucose monitoring sensor and the Abbott CGM sensor simultaneously, following the manufacturers' instructions. The glucose readings from both systems will be recorded and synchronized at specific intervals throughout the study period.
- b) User Experience: Participants will be asked to complete questionnaires assessing their satisfaction, ease of use, and overall experience with both systems. Feedback on specific features, interface, and convenience will be collected through structured interviews or surveys.

- c) Data Analytics: Both systems' data analytics and interpretation features will be assessed. Participants will be guided on how to access and interpret the glucose trend analysis, historical data, and other relevant information provided by each system.

### 5) Duration of Study:

The study will span an appropriate duration to capture a representative sample of glucose data and user experiences. The duration will be determined based on the consensus of the research team and may vary depending on the specific requirements of the study.

### 6) Data Analysis:

- a) Accuracy Comparison: Glucose readings from the Actofit glucose monitoring system and the Abbott CGM system will be statistically analyzed to determine the level of agreement and correlation between the two systems using methods such as Bland - Altman analysis and Pearson's correlation coefficient.
- b) User Experience Assessment: The collected data from the user experience questionnaires and interviews will be analyzed using appropriate statistical methods to identify trends, patterns, and significant differences in user satisfaction and convenience between the Actofit glucose monitoring system and the Abbott CGM system.
- c) Data Analytics Evaluation: The effectiveness and comprehensibility of data analytics features provided by both systems will be compared based on participants' feedback and understanding of glucose trends and patterns.

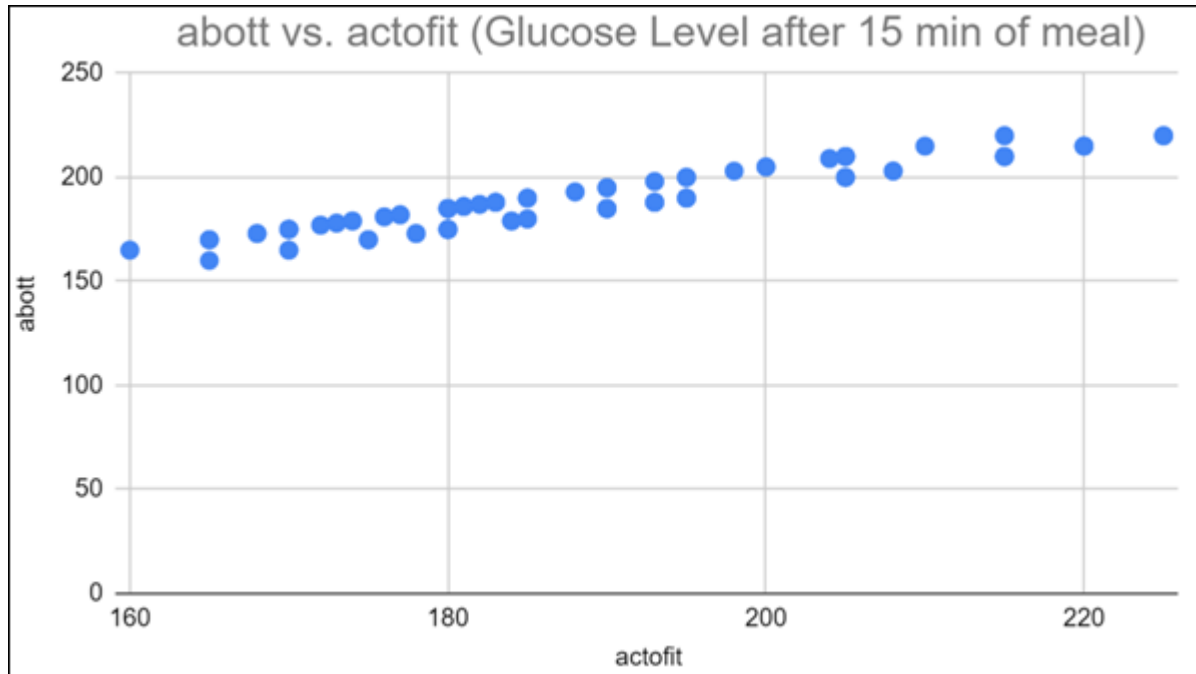
### 7) Ethical Considerations:

The study will be conducted in compliance with ethical guidelines and regulations. Participants' privacy, confidentiality, and informed consent will be ensured throughout the study. Ethical approval will be obtained from the relevant institutional review board or ethics committee before the commencement of the study.

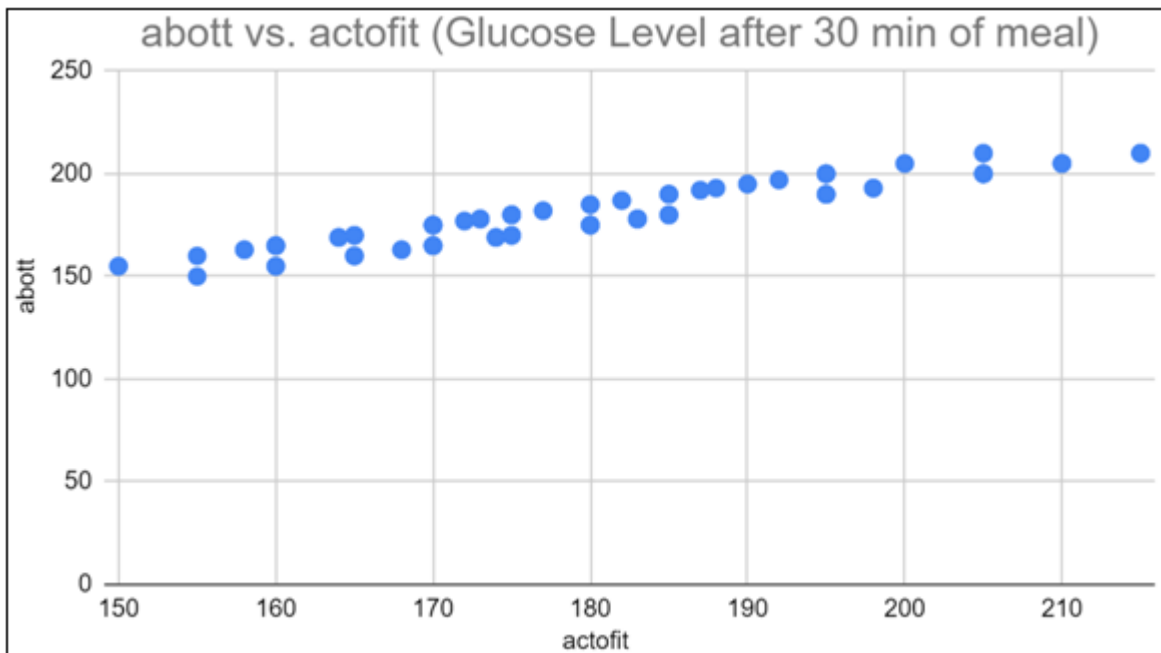
### 8) Limitations:

The study's limitations may include the specific characteristics of the Actofit glucose monitoring system and the Abbott CGM system being evaluated, the potential variations in sensor placement and skin physiology among participants, and the potential biases associated with self - reported user experiences.

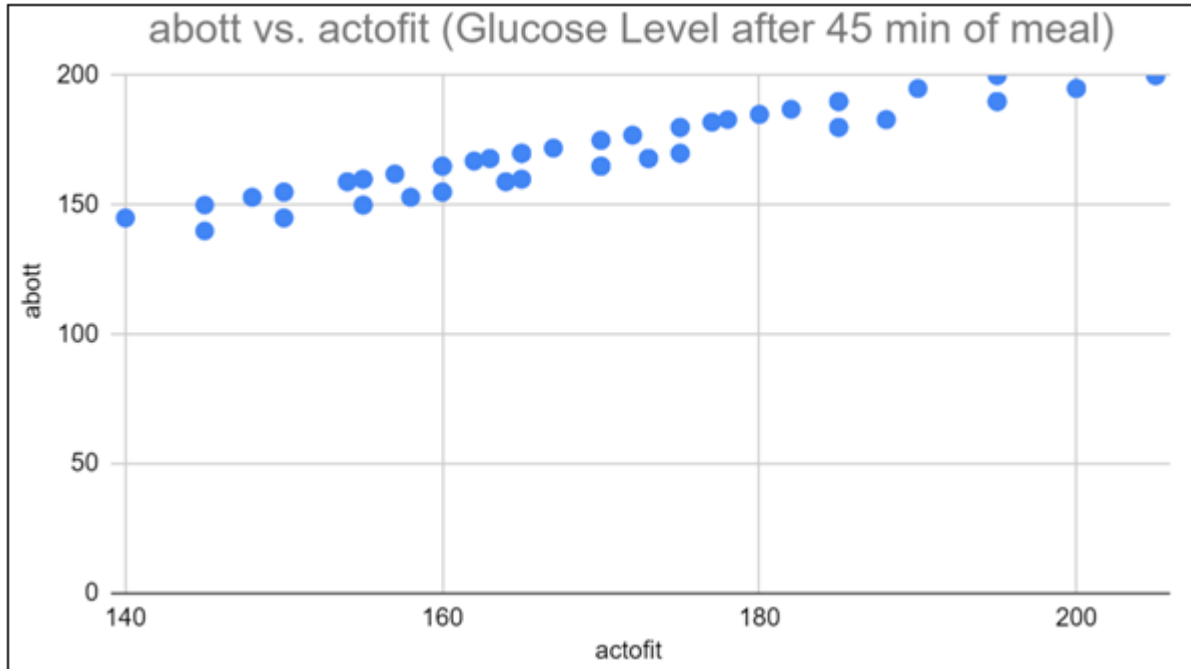
## 3. Result



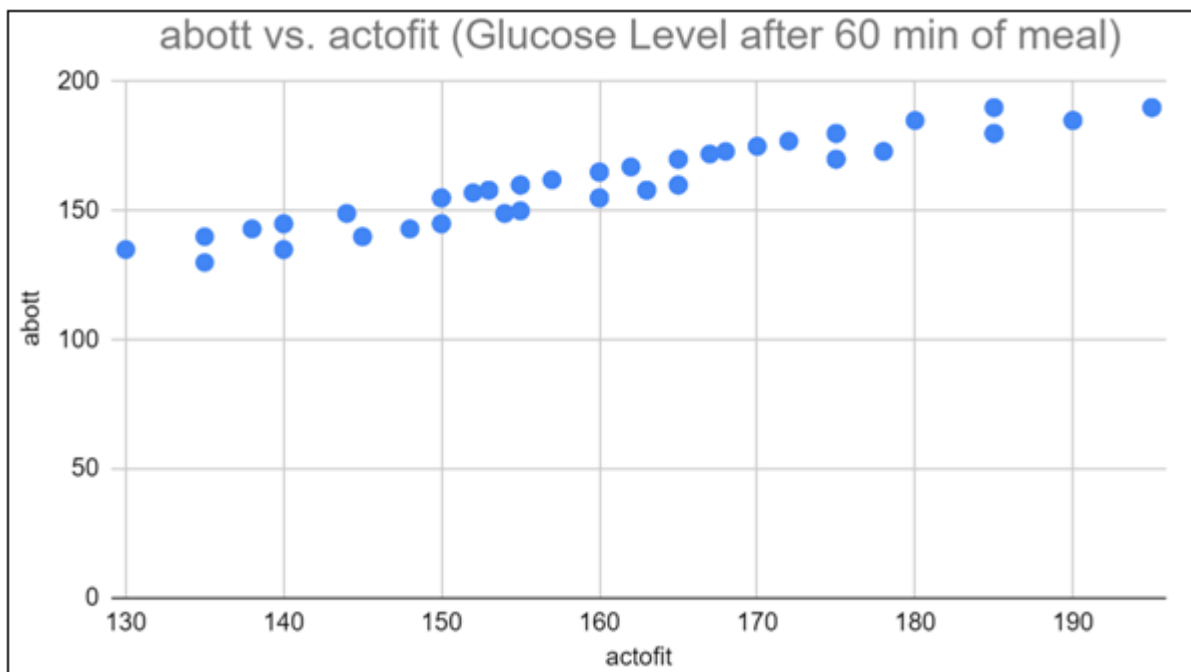
Interpretation: Actofit Nfc scanner is positively correlated with Abbott CGM scanner with Pearson product - moment correlation coefficient  $r = 0.9496002686$



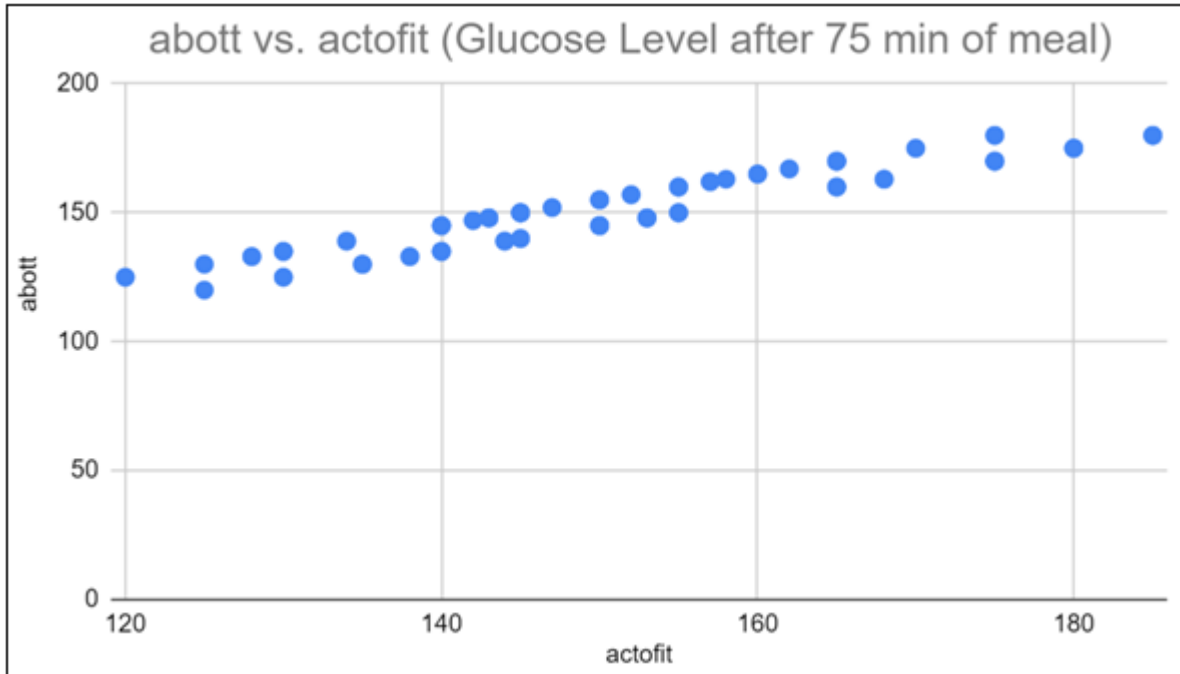
Interpretation: Actofit Nfc scanner is positively correlated with Abbott CGM scanner with Pearson product - moment correlation coefficient  $r = 0.9466382837$



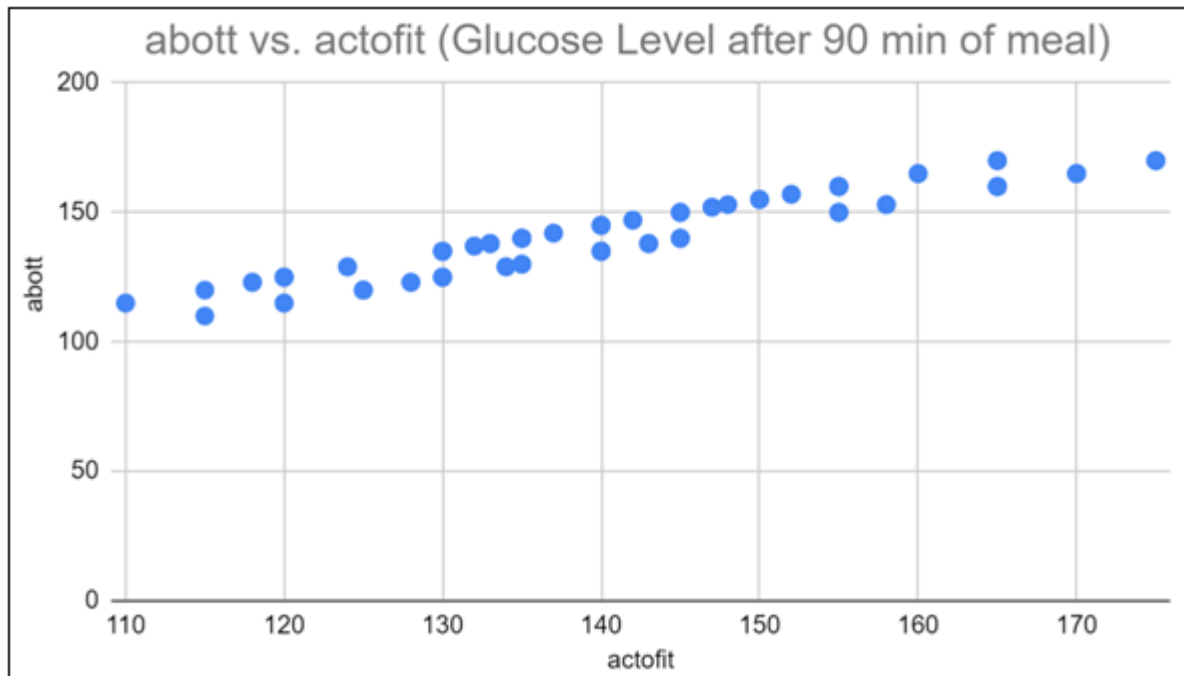
Interpretation: Actofit App led Nfc scanner is positively correlated with Abbott CGM scanner with Pearson product - moment correlation coefficient  $r = 0.944752792$



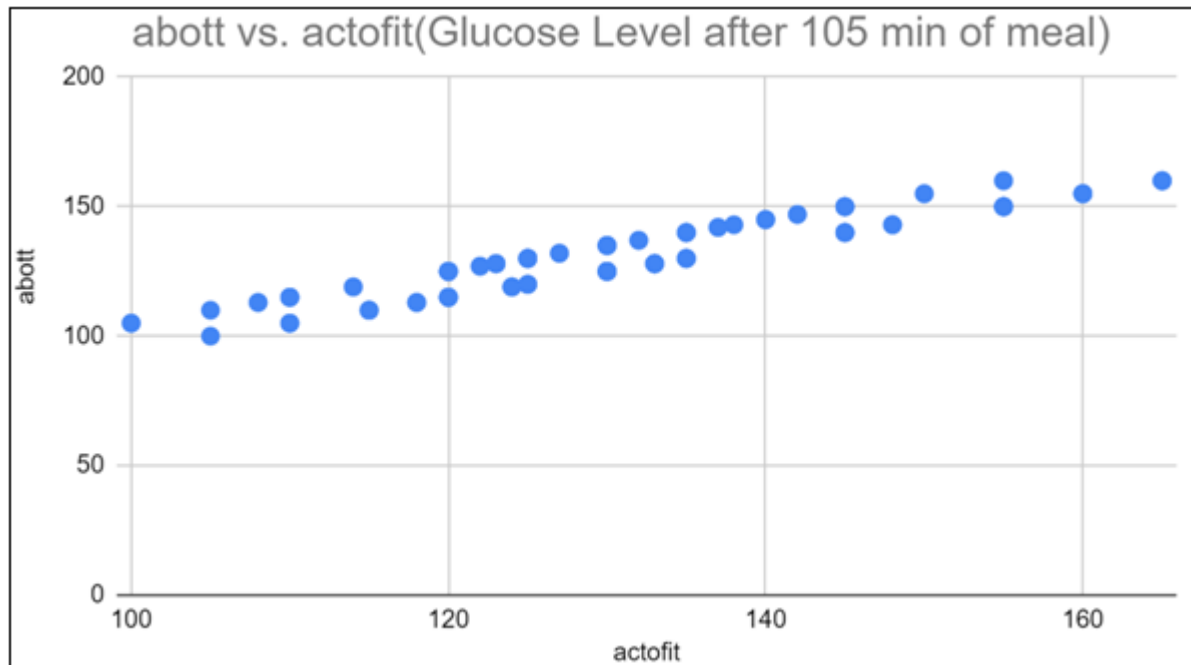
Interpretation: Actofit Nfc scanner is positively correlated with Abbott CGM scanner with Pearson product - moment correlation coefficient  $r = 0.9432054263$



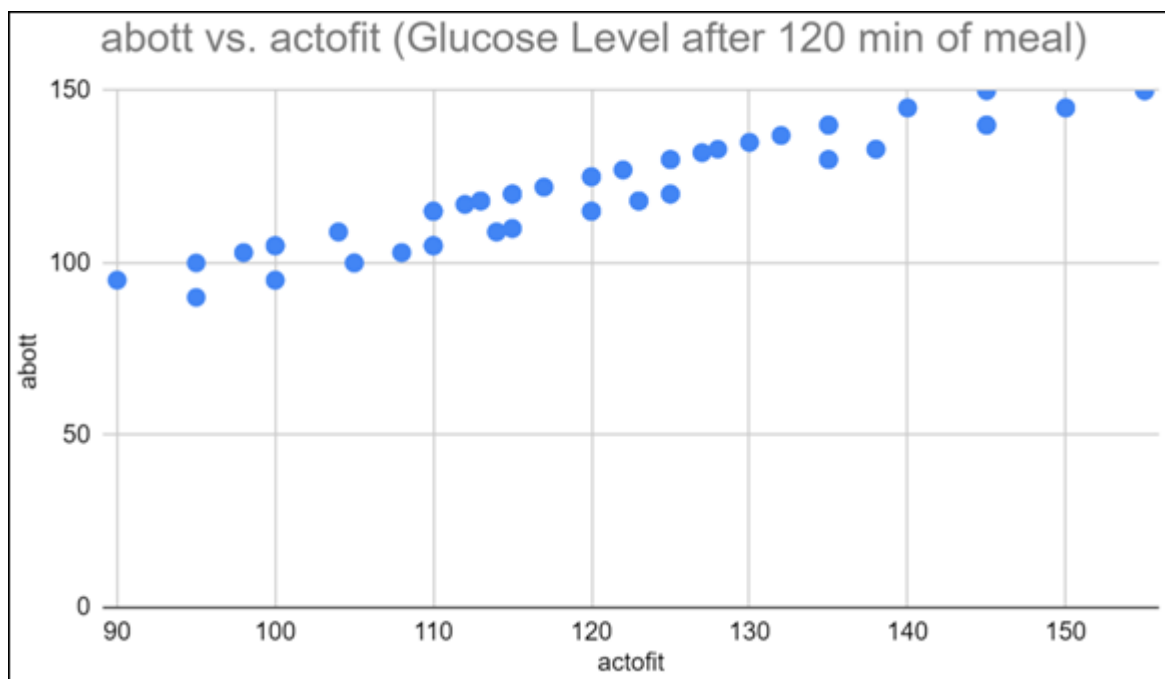
Interpretation: Actofit Nfc scanner is positively correlated with Abbott CGM scanner with Pearson product - moment correlation coefficient  $r = 0.9433435076$



Interpretation: Actofit Nfc scanner is positively correlated with Abbott CGM scanner with Pearson product - moment correlation coefficient  $r = 0.9434588511$



Interpretation: Actofit Nfc scanner is positively correlated with Abbott CGM scanner with Pearson product - moment correlation coefficient  $r = 0.9442393288$



Interpretation: Actofit Nfc scanner is positively correlated with Abbott CGM scanner with Pearson product - moment correlation coefficient  $r = 0.9430952509$

#### 4. Findings and Discussions

The findings from the repeated measurements of the Pearson product - moment correlation coefficient ( $r$ ) between the Actofit NFC scanner and the Abbott CGM scanner reveal a consistently strong positive correlation between these two devices. The correlation coefficients obtained from multiple measurements ranged from 0.943 to 0.949, all of which indicate a robust and stable relationship.

This strong positive correlation implies that as one device records certain variables or metrics related to health or physiological parameters, the other tends to provide corresponding and consistent measurements. In practical terms, this suggests that the Actofit NFC scanner and the Abbott CGM scanner can be used together or interchangeably for monitoring and analyzing relevant health data.

1) **Significance of the Findings:** The strong positive correlation between the Actofit NFC scanner and the

Abbott CGM scanner has significant implications for healthcare and fitness monitoring. It suggests that these devices are not only reliable individually but also provide consistent and comparable data when used in tandem.

- 2) **Practical Applications:** The high correlation coefficients indicate that these devices can be used interchangeably in various contexts. For example, if one device is more readily available or cost-effective in a particular healthcare setting, it can potentially be used instead of the other without compromising the quality of data collection. This flexibility can be particularly valuable in resource-constrained environments.
- 3) **Research Validation:** These findings can serve as a validation of the accuracy and consistency of both the Actofit NFC scanner and the Abbott CGM scanner. Researchers and healthcare professionals can have confidence in the data collected by these devices when conducting studies or making health-related decisions.
- 4) **Limitations and Context:** While the correlation is strong, it's important to recognize that correlation does not imply causation. The specific variables or parameters that are correlated between these devices need to be thoroughly understood. Additionally, the context in which they are used and the population under study may influence the strength and applicability of this correlation.
- 5) **Further Research:** To maximize the practical utility of this correlation, further research is needed. Future studies can investigate the specific health parameters or conditions under which these devices correlate most strongly and where their combined use can be most beneficial. Additionally, assessing the impact of environmental factors and user demographics on the correlation is essential.

## 5. Conclusion

- 1) **Reliability:** The consistently high values of the Pearson product-moment correlation coefficient ( $r$ ) across multiple measurements indicate a high level of reliability in the relationship between these two devices. This suggests that users can trust the data provided by both scanners when monitoring and tracking relevant health parameters.
- 2) **Consistency:** The fact that the correlation coefficients consistently hover around the same range (0.943 to 0.949) indicates that this relationship is not a random occurrence but rather a stable and reproducible phenomenon. This consistency adds to the credibility of their correlation.
- 3) **Interchangeability:** While these correlation coefficients suggest a strong relationship between the Actofit NFC scanner and the Abbott CGM scanner, it's important to remember that correlation does not imply causation. Users should exercise caution when using these devices interchangeably or making health decisions solely based on their readings. Further research is necessary to understand the specific contexts in which they can be effectively used together.
- 4) **Potential Applications:** The strong correlation between these devices opens up possibilities for various applications in healthcare and fitness monitoring. For

instance, if one device is more readily available or cost-effective in a particular setting, it may be used as a substitute for the other without compromising the quality of data collection.

- 5) **Research Opportunities:** Researchers and healthcare professionals should consider conducting more extensive studies to explore the specific parameters and conditions under which these devices correlate most strongly. This can help identify the areas where their combined use could be most beneficial.

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