Peertechz


CLINICAL GROUP

GLOBAL JOURNAL OF Medical and Clinical Case Reports OPEN ACCESS JOURNAL

ISSN: 2455-5282 DOI: https://dx.doi.org/10.17352/gjmccr

Research Article

# Views of Young People Living with Type 1 Diabetes on Continuous Glucose Monitor Use in Ghana

**Derrick Anim Yeboah[1], Anthony Edward Boakye[2]* and Rita Tekpertey[3]**

[1]Department of Population and Health, University of Cape Coast, Ghana

[2]Department of Health, Physical Education and Recreation, University of Cape Coast, Cape Coast, Ghana

[3]Department of Biostatistics and Epidemiology, University of Health and Allied Sciences, Ho, Ghana

**Received:** 02 June, 2025
**Accepted:** 09 June, 2025
**Published:** 10 June, 2025

***Corresponding author:** Anthony Edward Boakye, Department of Health, Physical Education and Recreation, University of Cape Coast, Cape Coast, Ghana, E-mail: yiadomb587@gmail.com

**Keywords:** Continuous glucose monitor; Living; Type 1 diabetes; Use; Views; Young people



https://www.clinsurggroup.us

Check for updates

## Abstract

This study investigated the views of young people living with Type 1 diabetes regarding the usability, benefits, and challenges of Continuous Glucose Monitoring (CGM) devices. Given the limited availability and high cost of CGMs in Ghana, the research aimed to understand how these young people navigate their diabetes management with this technology. Through qualitative interviews with ten (10) young people aged 15-24 years, the study gathered insights into their daily use of CGMs. The findings revealed that while CGMs significantly enhance blood sugar control and increase awareness of the impact of lifestyle choices on glucose levels, they also present challenges. Participants reported issues such as the high cost of CGMs, technical difficulties, physical discomfort from sensors, and social stigma associated with wearing the devices. Despite these challenges, the study highlighted the potential of CGMs to improve diabetes management for young people, provided that the barriers of cost and usability can be addressed. The study recommends that young people should read more about CGM and how it can be used effectively.

## Abbreviations

CGM: Continuous Glucose Monitor; CGMs: Continuous Glucose Monitors; IDF: International Diabetes Federation; SMBG: Self-Monitoring Blood Glucose; T1D: Type 1 Diabetes; UHAS-REC: University of Health and Allied Sciences Ethical Review Committee

## Introduction

Type 1 diabetes (T1D) is a life-threatening chronic condition in which the pancreas produces little or no insulin, a hormone that controls the amount of sugar in the blood to produce energy [1,2]. There is no known prevention for T1D, however, it can be treated effectively with access to vital health services and supplies, living a healthy lifestyle, and monitoring blood sugar [3-6]. Globally, the prevalence of T1D continues to rise [7,8]. In 2022, approximately 8.75 million people were living with T1D, with 1.52 million under the age of 20 [9,10]. The exact causes of T1D are unknown [1,11-13]. However, research shows that the possibility of developing the condition increases slightly if a family member has it [11,14,15]. Also, environmental factors, such as exposure to a viral infection, can trigger an autoimmune reaction leading to T1D [12,16]. The potential of early screening and risk monitoring in treating T1D can be pivotal to reducing the risk of diabetes-related complications [17-19].

A chronic Non-Communicable Disease (NCD), diabetes can have severe and life-threatening outcomes if not properly managed [20,21]. Glucose self-monitoring, or the use of home-based diagnostic devices to routinely monitor glucose levels, is recommended for people living with diabetes to adjust treatment dosages and prevent dangerous fluctuations in glucose levels [22]. Glucose self-monitoring is, therefore, an integral component of diabetes management [23,24]. There are two broad product classes of glucose self-monitoring devices: (1) Self-Monitoring Blood Glucose (SMBG) systems whose basic technology has been the standard of care for decades; and



**Citation:** Yeboah DA, Boakye AE, Tekpertey R. Views of Young People Living with Type 1 Diabetes on Continuous Glucose Monitor Use in Ghana. Glob J Medical Clin Case Rep. 2025:12(6):127-139. Available from: https://dx.doi.org/10.17352/2455-5282.000213

(2) Continuous Glucose Monitoring (CGM) systems, which are newer, more expensive, and technologically advanced product class [23,24].

However, the CGM is one of those advanced approaches that track blood sugar levels in people with diabetes [23,25,26]. Unlike traditional finger-prick tests, CGM devices measure glucose in the fluid between body cells every few minutes. CGM is wearable technology that tracks patients' glucose (sugar) levels over time [26-28]. It measures the glucose level in the interstitial fluid just under the patient's skin 24 hours a day while wearing the device [29,30]. Managing diabetes involves managing blood sugar levels [21]. A CGM gives real-time information on how one's glucose levels are changing [21]. For type 1 diabetic patients using CGM, embrace a reduced fear of hypoglycemia and improved quality of life [31-33]. Besides, advances in CGM technology have made lives easier for people living with T1D [34]. Insulin administration and blood glucose (blood sugar) monitoring have transformed from multiple finger pricks in a day to a few swipes on a cell phone [35]. With a CGM, one can see in real-time if they are trending high or low and take preventative measures against hypo and hyperglycemia [23,36,37]. Real-time CGM monitoring has led to tremendous outcomes for people with diabetes who, without a CGM, may have experienced potentially life-threatening complications [23,38-40].

CGM, since being introduced in recent years, has become a key tool in achieving optimal diabetes management for people living with diabetes [41-44]. However, managing T1D can be a challenge and takes time to get used to. Constantly trying to meet blood glucose targets can lead to a feeling of burnout [45]. Yet, maintaining a healthy blood sugar range is the best way to avoid health complications [35]. It is recommended that all people living with T1D should have equitable access to the most effective diabetes management systems, including technology that is clinically appropriate, regardless of age or concessional status [46,47]. Nonetheless, the willingness of the person with T1D and their engagement with technology should be key in deciding whether to start or continue all devices [48-50].

While CGM is more often recommended for people with T1D [39,51-54], Deeb, et al. [55], however, recognize that several barriers can lead to discontinuation of CGM, including pain, skin reactions, concerns around accuracy, sensor loss, interference with daily activity, and alarm fatigue. Besides, research on CGM has mostly focused on its usage in high-income countries, leaving a gap in our understanding of how young people living with T1D in low-resource settings like Ghana perceive the technology [56-59]. Based on this, the study aimed to fill this gap by investigating the views of young people living with T1D on CGM usage, benefits, and challenges in Ghana. Specifically, the study seeks to: (1) evaluate the usability of CGM among young people living with T1D in Ghana; (2) examine the benefits of using CGM among young people living with T1D in Ghana; and (3) analyze the challenges associated with CGM use among young people living with T1D in Ghana.

# Methods

## Research philosophy

The study is grounded in interpretivism, a research philosophy that focuses on understanding the subjective experiences and meanings that individuals attach to their reality [60-61]. This approach is appropriate for investigating the personal and lived experiences of young people living with T1D, as the use of CGM devices is influenced by personal, social, and environmental factors [60,61]. Interpretivism allows for a more in-depth understanding of how these young people perceive the usability of CGM devices and how the devices impact their daily lives [60,61].

## Study design

This study used a cross-sectional descriptive design to investigate the views of young people living with T1D on the use of CGMs. The design was chosen because it enables researchers to gather detailed information about a phenomenon at a single point in time [62-64].

## Study area and participants

The study focused on young people from Accra and Kumasi, the two largest cities in Ghana. These locations were chosen because CGM devices are not easily available in Ghana and are often imported at high costs. Despite these challenges, some families in these cities have managed to obtain and use them. Hence, they make them an ideal population for the study.

## Inclusion and exclusion criteria

In this study, participants were selected based on specific criteria to make sure they were suitable for the study. For a participant to be part of the study, he or she must be: (1) diagnosed with T1D for at least one year. (2) Not less than or older than 15- 24 years, (3) using a CGM device for at least one month, and (4) willing to participate. However, young people who did not meet the criteria were excluded from the study. The study enrolled young people because they represent a vulnerable group in diabetes management. Hence, they deal with challenges such as increased independence, peer pressure, and the complexities of managing a chronic illness during a critical developmental stage [65-67].

## Sampling technique

This study employed purposive sampling and a snowballing approach to select participants who met the specific inclusion criteria. Purposive sampling allows the researcher to intentionally select individuals who have relevant experiences and can provide valuable insights into the research objectives [68-70]. This study was supported by the theory of saturation. This is achieved when no additional themes or insights emerge from the data collection, and all conceptual categories have been explored, identified, and completed [71].

## Interview guide

The interview guide was developed based on the research objectives and consisted of open-ended questions to facilitate



**Citation:** Yeboah DA, Boakye AE, Tekpertey R. Views of Young People Living with Type 1 Diabetes on Continuous Glucose Monitor Use in Ghana. Glob J Medical Clin Case Rep. 2025:12(6):127-139. Available from: https://dx.doi.org/10.17352/2455-5282.000213

rich, detailed responses. The guide was divided into three main sections: (1) Usability of CGM Devices (How long have you been using the CGM device? How easy or difficult is it to use the CGM in your daily life? What challenges do you face when using the device? And what features of the CGM do you find most helpful?) (2) Benefits of Using CGM Devices (How has the CGM helped you manage your diabetes? Have you noticed any changes in your glucose levels since you started using the CGM? And how has CGM use impacted your daily activities and lifestyle?) (3) Challenges of CGM Use (Have you experienced any technical issues with the device? Do you experience any physical discomfort from wearing the sensor? How do others react to you wearing a CGM device? And is the cost of the device affordable for you and your family?)

## Data collection procedure

Semi-structured interviews were used as the primary method of data collection. This approach was selected because it allows for flexibility in the conversation while ensuring that all key topics related to the research objectives are covered [72,73]. Semi-structured interviews enable participants to express their thoughts and experiences openly, providing in-depth insights into their use of CGM devices [72]. The interviews were conducted through phone interviews, depending on the participants' preferences and availability. The interviews were conducted in the English language and lasted for 10 minutes. Also, the interviews were recorded for transcription. The interview guide was used to ensure consistency. However, follow-up questions were asked to encourage participants to elaborate on their experiences.

The choice of a qualitative method allowed for a deeper exploration of personal experiences, providing rich data that goes beyond mere statistics to understand the nuanced ways in which these young people interact with CGM technology [74,75]. The use of phone interviews ensured that participants could comfortably share their experiences without the pressure of face-to-face interactions, which can sometimes inhibit honest responses [76-78]. This method also allowed for flexibility in scheduling, accommodating the busy lives of adolescents, many of whom are balancing school, work, and diabetes management [79,80].

## Data analysis

The data collected through the phone interviews were analyzed using deductive thematic analysis, a qualitative method that involves identifying, analyzing, and reporting patterns (themes) within the data [81,82]. Thematic analysis was chosen because it allows for the systematic exploration of key themes related to the usability, benefits, and challenges of CGM devices [83,84]. This process involves careful steps to ensure that the findings accurately reflect the lived experiences of the participants. The process usually starts with transcription, followed by familiarization, thus careful readings of the transcripts multiple times to understand patterns in the data.

The data was coded by highlighting significant phrases and labeling them with short descriptions. These codes were then grouped into broader themes that represented the key issues discussed by the participants, such as economic challenges, psychological benefits, and social difficulties related to CGM use. Finally, the findings were reported, with direct quotes from participants to illustrate the main themes.

## Ethical consideration

Ethical issues were a key part of the study. As a result of this, the research protocol was submitted to the University of Health and Allied Sciences Ethical Review Committee (UHAS-REC) for ethical approval. This was done to ensure that the study was in accordance with ethics. Following the submission of the research protocol, the UHAS-REC approved the research protocol and granted ethical clearance with ID number UHAS-REC A./111/21-22. However, in the field, oral informed consent was obtained from participants aged 18-24, while participants below 18 years assented after their parents had consented. Also, participation was made voluntary due to this, participants were not restricted from withdrawing from the study at any time they deemed appropriate without any consequences. Again, participants' privacy and confidentiality were guaranteed. They were told that the information they provided would be used for academic purposes alone and that whatever information they provided would be kept confidential from third parties. On anonymity, the data collected was devoid of names, contacts, and anything that could identify a participant in the data. Then, the results were also reported in a manner that protected the identities of the participants.

## Trustworthiness

To ensure the trustworthiness of the study, an effort was made to satisfy the four dimensions of trustworthiness in a qualitative study. Namely: Credibility, transferability, dependability, and confirmability. To achieve credibility, we employed rigorous in-depth interviews to gather comprehensive and accurate data. Additionally, we considered member checking, where some participants were asked to review and verify the accuracy of our interpretations, just to ensure that the findings aligned with participants' views. Further, on transferability, we made sure we provided detailed descriptions of the research context, including the setting, participants enrolled, and relevant background information. We were convinced that by offering thorough contextual information, readers can assess the applicability of the findings to their contexts or populations, hence, transferability.

Furthermore, we ensured dependability by maintaining clear and transparent documentation of the research process, including data collection procedures, data analysis techniques, and interpretation methods. By documenting each step of the research process, we assumed it would enable others to replicate the study and verify its findings. Then, on confirmability, we maintained reflexivity, where we critically reflected on our own biases and assumptions throughout the research process. Also, we engaged in peer debriefing or member checking, where colleagues or participants reviewed and provided feedback on the interpretations we made of the data.



**Citation:** Yeboah DA, Boakye AE, Tekpertey R. Views of Young People Living with Type 1 Diabetes on Continuous Glucose Monitor Use in Ghana. Glob J Medical Clin Case Rep. 2025:12(6):127-139. Available from: https://dx.doi.org/10.17352/2455-5282.000213

## Results

### Socio-demographic characteristics of participants

The study comprised 60% females and 40% males. Whereas 60% of the participants are between 20 and 24 years, 40% of them are in the 15 - 19 years age group. More than half (60%) of the participants had completed secondary school. Whereas 60% are businessmen, 10% are farmers. Less than half (40%) of the participants have lived with T1D for 4 years or above, while 10% have lived with the condition (T1D) for 2 years. More than thirty percent (40%) of the participants have used the CGM device for 6 years, while 30% have used it for either less than 1 year or 2 years (Table 1).

A thematic map of the results from the interviews is shown in Figure 1. Three themes, each with sub-themes ranging from three to four, were generated.

### Theme 1: Usability of CGM

This theme has four sub-themes telling us how participants use the device in relation to the duration of use, source of knowledge on its use, ease of use, and technical issues (Figure 2).

### Duration of use

The average duration of CGM usage among the participants was 11.5 months, with the minimum being 1 month and the maximum being 36 months. Participants expressed varying levels of familiarity with the devices, largely correlating with the length of time they had been using them. As expressed by some participants:

"I have been using the CGM for six months and a year now" [P1].

"I have been using CGM for three years" [P7].

"I have been using it for a month now" [P6].

"I have been using CGM for 2 months now" [P10].

These quotes illustrate that familiarity with the device generally increases with prolonged use. Participants with longer usage experience reported greater ease and efficiency in managing their diabetes with CGMs, while those with shorter experience were still acclimatized to the technology. This suggests that the duration of use plays a crucial role in determining how comfortable and proficient users become with CGM technology.

### Source of knowledge

Participants acquired knowledge about CGMs from various sources, including healthcare providers, digital sources, and manuals. The diverse sources of information commemorate why young people increasingly rely on digital media for health-related information, particularly in contexts where formal healthcare guidance is limited. Based on this, a participant recounted that;

"I received my knowledge from healthcare providers" [P1].

**Table 1:** Socio-demographic Characteristics of Participants.

| Variable | Frequency | Percentage |
|---|---|---|
| Sex | | |
| Male | 4 | 40.0 |
| Female | 6 | 60.0 |
| Age | | |
| 15-19 | 4 | 40.0 |
| 20-24 | 6 | 60.0 |
| Education | | |
| Secondary | 6 | 60.0 |
| Tertiary | 4 | 40.0 |
| Occupation | | |
| Business. | 6 | 60.0 |
| civil servant | 3 | 30.0 |
| Farming | 1 | 10.0 |
| The RS lived with the T1D. | | |
| < 1year | 3 | 30.0 |
| 2years | 1 | 10.0 |
| 4 years and above | 4 | 40.0 |
| from birth | 2 | 20.0 |
| Years used the CGM device. | | |
| <1year | 3 | 30.0 |
| 1year | 3 | 30.0 |
| >6years | 4 | 40.0 |

Source: Fieldwork (2022).

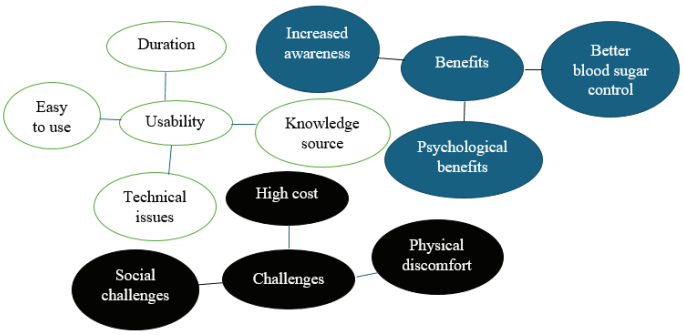


**Figure 1:** Thematic Map Illustrating Themes and Sub-Themes.

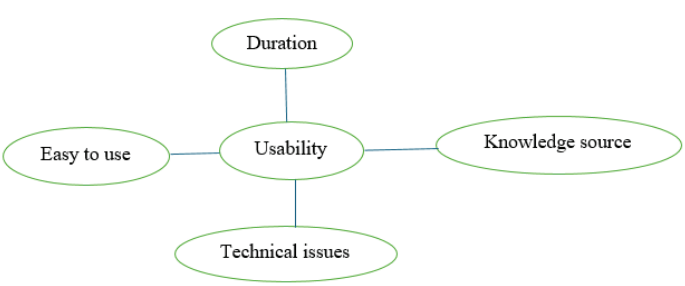


**Figure 2:** Thematic Map Illustrating a Theme and Four Sub-Themes.



**Citation:** Yeboah DA, Boakye AE, Tekpertey R. Views of Young People Living with Type 1 Diabetes on Continuous Glucose Monitor Use in Ghana. Glob J Medical Clin Case Rep. 2025:12(6):127-139. Available from: https://dx.doi.org/10.17352/2455-5282.000213

Another participant intimated that I first learned about CGM devices via an online community... also on Instagram. I have been seeing a lot more diabetics using the CGM" [P8].

This diversity in information sources highlights the role of both formal medical guidance and informal digital communities in educating adolescents about CGMs.

### Easy to use

Most participants found CGMs relatively easy to use when they became familiar with the device. The convenience of continuous data without the need for frequent finger-prick tests was highly valued. These are some comments made by some participants;

"I love not having to prick my finger all the time. The CGM just does it for me" [P3].

"It is very easy because the pricking really hurts" [P7].

"It is easy to use as you would not need to prick your hand each time to know your sugar level... Using CGM is easy as you would not need to experience these symptoms because it would tell you immediately your sugar level goes low or high. It will just send you a notification" [P1].

These comments underscore the simplicity and comfort that CGMs offer once users become accustomed to the device. The reduction in the need for manual glucose checks not only eases physical discomfort but also alleviates the psychological burden of constant monitoring. This ease of use is critical for encouraging consistent and long-term use among young people, who struggle with the traditional way of glucose monitoring method.

### Technical issues

Despite the general ease of use, some participants experienced technical difficulties, particularly with connectivity issues when the device was not close enough to the sensor. These issues highlighted potential areas for improvement in CGM design and functionality, particularly in ensuring stable and reliable connections. Concerning technical issues, these were what some participants shared;

"Sometimes, I forget and go far from the sensor because it is connected via Bluetooth. When you go far from the sensor, it disconnects" [P6].

"It disconnects when I am not close to the CGM. I will have to bring it close before it connects again" [P7].

"When it disconnects and you want to connect it back, it's annoying. You have to always keep it close to you" [P9].

These technical issues suggest that while CGMs are user-friendly, there are areas where reliability could be improved, particularly in ensuring stable connections between the sensor and the transmitter.

## Theme 2: Benefits of CGMs

This theme has three sub-themes illustrating the benefits participants derived from the CGM device about blood sugar control, increased awareness, and psychological gains (Figure 3).

Better Blood Sugar Control: A significant benefit reported by participants was the improvement in blood sugar control, facilitated by real-time monitoring that allowed for timely adjustments in insulin dosage, diet, and activity levels. This level of control is particularly crucial for young people who may experience more frequent and unpredictable blood sugar fluctuations due to growth, hormonal changes, and varying activity levels. Based on this, some participants narrated that:

"The device just gives me my sugar levels all the time... with the constant reading of my sugar, I can control it very well" [P3].

"It continuously records, so when you are going high or low, it alerts, and then you have to take your injection and your medication" [P5].

"It has helped me manage it because... it alerts me immediately my sugars are going down" [P9].

These narrations reflected the importance of real-time feedback in managing diabetes more effectively. The ability to continuously monitor blood glucose levels empowers young people to make informed decisions about their health, reducing the likelihood of severe hypo- or hyperglycemic events. This is particularly important in Ghana, where access to emergency medical care may be limited, and preventing such events is critical for maintaining long-term health.

### Increased awareness

CGMs also heightened participants' awareness of how different foods and activities impacted their blood sugar levels, allowing them to make more informed lifestyle choices. This awareness is essential for developing personalized management plans that align with the unique needs of each young person. Based on this, participants described that:

"Well, I have learned that eating late increases my sugars" [P3].

"I have learned that eating a lot was what kept my sugar going up, so after I stopped eating too much, it is better" [P4].

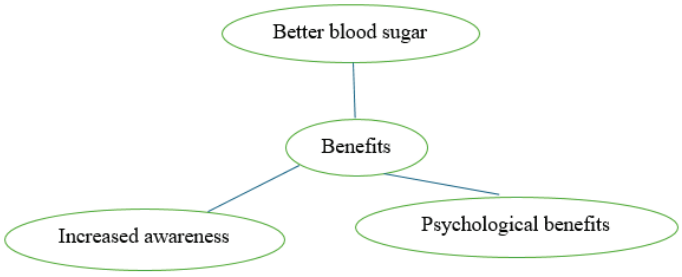


**Figure 3:** Thematic Map Illustrating a Theme and Three Sub-Themes.



**Citation:** Yeboah DA, Boakye AE, Tekpertey R. Views of Young People Living with Type 1 Diabetes on Continuous Glucose Monitor Use in Ghana. Glob J Medical Clin Case Rep. 2025:12(6):127-139. Available from: https://dx.doi.org/10.17352/2455-5282.000213

"When you are playing, it would just come off if you are not careful" [P7].

"Exercising a lot has made me realize my sugars go low fast" [P4].

This increased awareness is a critical benefit of CGMs, as it allows users to tailor their diabetes management to their specific needs. Understanding the impact of diet and physical activity on blood sugar levels enables young people to take proactive steps in managing their health, potentially leading to better long-term outcomes. Additionally, this level of self-awareness can foster a greater sense of responsibility and independence in managing their condition.

### Psychological benefits

The continuous monitoring provided by CGMs offered significant psychological benefits. Based on this, participants reported feeling less anxious about their blood sugar levels because they could constantly monitor it. This reduction in anxiety allowed them to engage more fully in their daily activities, such as sports, social events, and academic pursuits without the constant worry of experiencing a hypoglycemic event.

"I don't have to worry about my sugars dropping without me knowing. It gives me peace of mind" [P2].

"Knowing that I can check my levels anytime makes me feel more secure, especially when I'm out with friends" [P8].

Young people, being able to manage their diabetes condition discreetly and effectively with CGMs, might help lessen some of the stress and stigma associated with the condition, thereby enabling them to participate more fully in their social and academic lives.

## Theme 4: Challenges associated with CGMs

This theme has three sub-themes showing the challenges participants faced with using the CGM device in relation to cost, social challenges, and physical discomfort (Figure 4).

The high cost of CGMs is a significant challenge, which makes them inaccessible to many families. The initial expense of the device, along with the ongoing cost of sensors that need to be replaced regularly, posed a considerable financial burden, particularly in a low-resource setting like Ghana. Regarding the challenge of CGM, participants often narrated that:

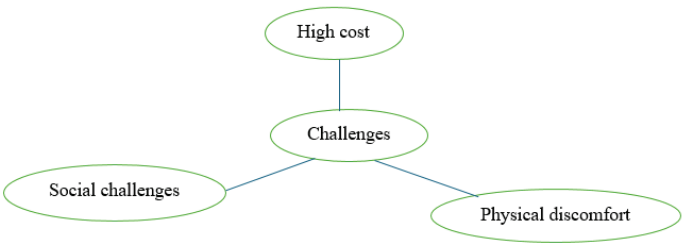


**Figure 4:** Thematic Map Illustrating a Theme and Three Sub-Themes.

"It's not affordable. Not sold in Ghana, so it's not affordable" [P6].

"Yes, it's very expensive. It's not around here. There's a doctor outside the country who helps me get them" [P3].

This financial barrier highlights the need for more affordable options or financial assistance programs to make CGMs accessible to a broader population. The high cost of CGMs limits their widespread adoption, potentially increasing health disparities among young people living with Type 1 diabetes.

### Physical discomfort

Some participants experienced physical discomfort from wearing the CGM sensor, particularly irritation after extended use. The sensor, typically worn on the skin for many days, can cause itching or discomfort, which may discourage consistent use. Given this, some participants shared that:

"It irritates sometimes, but I just scratch it when it does that" [P4].

"It only itches after I take it off after 10 days, which is normal because it's been attached to my body for like 10 days" [P6].

This discomfort suggests the need for more comfortable sensor designs to improve user experience. Physical discomfort can be a significant hindrance to the consistent use of CGMs among young people.

### Social challenges

Participants also faced social challenges, such as drawing unwanted attention and questions from others about the device. The visible nature of the CGM sensor can lead to stigma or embarrassment, particularly in social situations where the device may attract curiosity or misunderstanding. In line with this, participants described that:

"When people see it and ask lots of questions. Sometimes it makes you feel off" [P10].

"People look at you the moment it alerts you with the loud beep. And people want to take it off when they see it" [P6].

"Society sometimes doesn't know what it is, so they ask questions" [P5].

"I even beg my friends to let me play football because they think I'm not strong enough to play football" [P4].

These challenges highlighted the stigma and social discomfort associated with wearing a visible medical device, which invariably affected young people's willingness to use CGMs openly. The social aspect of diabetes management is particularly sensitive for young people who are within the age where peer acceptance is crucial. The visibility of CGMs can mark them differently, leading to feelings of isolation or embarrassment.



**Citation:** Yeboah DA, Boakye AE, Tekpertey R. Views of Young People Living with Type 1 Diabetes on Continuous Glucose Monitor Use in Ghana. Glob J Medical Clin Case Rep. 2025:12(6):127-139. Available from: https://dx.doi.org/10.17352/2455-5282.000213

## Discussion

The study revealed that CGMs are generally easy to use for most young people living with type 1 diabetes, especially after getting used to the device. The participants appreciated that CGMs allowed them to check their blood sugar levels without having to prick their fingers all the time. This is a significant advantage because frequent finger-pricking can be painful and disruptive, especially for adolescents who need to monitor their blood sugar several times a day. The convenience of CGMs makes it easier for participants to keep track of their blood sugar levels throughout the day, which is crucial for managing their diabetes effectively. This finding corroborated with previous research, which found that half of the participants (14 out of 28) found the functionality and services of the CGM device extremely convenient, particularly appreciating the memo feature that allowed them to record changes in blood sugar levels in real-time, thereby gaining confidence in its accuracy [85,86]. This finding purports that when a medical device is easy to use, it increases the likelihood that people will consistently use it.

However, a significant proportion of the participants narrated the challenges they encountered with the use. The most cited was connectivity, which indicates that the sensor might not be close to the transmitter. If it happens, it might not make the device able to track their blood sugar levels continuously. Mostly, when the device loses connection, it causes anxiety because the users might not be sure if their blood sugar levels are being monitored accurately. For young people, who may already be feeling stressed about managing their diabetes, these technical problems can add to their frustration and make them less likely to trust the device. Improving the reliability of CGMs, particularly the stability of the connection between the sensor and the transmitter, could significantly enhance the user experience. If the devices work more consistently, it would likely increase users' confidence in the technology, leading to better and more consistent use of the device. This outcome agrees with a previous study, which found that multiple barriers lead to the underuse of CGM including pain, skin complications related to adhesive strips, alarm fatigue, concerns about accuracy, loss of sensor connectivity, discrepancies compared to capillary glucose readings, and interference with daily activity and exercise [87].

The study found that young people living with diabetes were able to use their CGMs effectively. This finding commemorates the clear guidance they had from healthcare providers and the information found online. Receiving knowledge about CGMs from the right source could play a significant role in the effectiveness and ease of use of the devices. When users, especially young users, are well-informed about how to use a device, they are more likely to use it correctly and get the most benefit from it. This highlights the need for healthcare providers to offer comprehensive training and ongoing support to ensure that users are comfortable with their CGMs and know how to use them properly. For many adolescents, using a CGM might be their first experience with advanced medical technology, and it can be challenging to learn how to use it. Without proper guidance, they might struggle with the device, leading to frustration and possibly even abandonment of the technology. Healthcare providers play a key role in this process. By providing clear instructions, answering questions, and offering continued support, they can help teenagers feel more confident in using CGMs, which can improve their overall diabetes management. This finding is in line with a previous study that structured education programs that accompany CGM have been shown to improve glycemic management, improve patient knowledge, and self-management skills [88].

The study found better control of blood sugar levels as one of the benefits. CGMs provide real-time information about blood sugar levels, allowing users to make immediate adjustments to their insulin doses, diet, or physical activity. This real-time monitoring is especially important for adolescents, who may experience rapid changes in blood sugar levels due to their active lifestyles and changing bodies [23]. By providing continuous data, CGMs help prevent both high and low blood sugar levels, which are critical to avoiding complications and staying healthy. This benefit is supported by other research, which shows that CGMs can significantly improve blood sugar control in people with diabetes. By using a CGM, adolescents can keep their blood sugar levels more stable, which reduces the risk of both short-term problems, like fainting from low blood sugar, and long-term complications, like damage to the eyes or kidneys from high blood sugar. For young people who are still learning how to manage their diabetes, having a tool that provides real-time feedback can be incredibly valuable. This finding corroborated with previous studies, which found that CGM and intermittently scanned CGM (is-CGM) have been shown to effectively manage diabetes in the specialty setting [39,89,90].

Further, the study found that CGMs helped young people become more aware of how their lifestyle choices affected their blood sugar levels. For example, participants noticed how different foods or activities impacted their blood sugar, which helped them make better decisions about what to eat and how active to be. This kind of awareness is crucial for managing diabetes effectively because it allows participants to see the direct consequences of their actions on their health. This increased awareness empowers young people to take more control over their diabetes management, aligning with a study that found that diabetes education is crucial for understanding and controlling T1D. It includes personalized sessions, webinars, group classes, and clinics that provide customized therapies. Comprehensive education enhances glycemic control and family dynamics. Nevertheless, the implementation of diabetes education for families requires specific standards, especially in the field of nursing [91]. When patients can see how their choices affect their blood sugar levels, they are more likely to make healthy decisions and stick to their treatment plans. This sense of control is especially important for adolescents, who are at a stage in life where they are seeking more independence. By using CGMs, they can take charge of their health in a way that feels empowering rather than restrictive.

The study also highlighted the psychological benefits of using CGMs. Many participants reported feeling less anxious



**Citation:** Yeboah DA, Boakye AE, Tekpertey R. Views of Young People Living with Type 1 Diabetes on Continuous Glucose Monitor Use in Ghana. Glob J Medical Clin Case Rep. 2025:12(6):127-139. Available from: https://dx.doi.org/10.17352/2455-5282.000213

about their blood sugar levels because the CGM continuously monitored their glucose levels. This anxiety reduction allowed them to participate more fully in daily activities, such as sports, social events, and school, without constantly worrying about their diabetes [92-94]. This improved quality of life is a major benefit of using CGMs, as it helps adolescents live more normal, active lives while managing their diabetes.

Other studies have also found that CGMs can reduce the stress and burden of diabetes management by providing continuous monitoring and reducing the need for frequent finger-prick tests. By making diabetes management easier and less intrusive, CGMs can help adolescents feel more confident and less overwhelmed by their condition [95-98].

The study found high cost and physical discomfort as major challenges associated with the use among young people living with diabetes. The reason participants reported the high cost of the CGMs as a challenge could be that they found CGMs and their sensors to be expensive and that replacing them was not easy for them. Hence, it serves as a significant barrier for participants. This outcome refuted previous studies, which found that cost was not a major reason for noncompliance with CGM use [55,99]. On the contrary, the outcome corroborated with previous research, which found that cost, concerns related to accuracy and reliability of measurements, insertion, adhesion, and removal issues all emerged as barriers to CGM use. Further, the authors affirmed that the high cost of CGM imposes a heavy financial burden on patients for long-term use [100,101]. While CGMs offer many advantages, their high price makes them inaccessible to many people who could benefit from them. This is particularly problematic in low-income regions, where access to advanced medical technology is already limited. The high cost of CGMs can prevent many families from using this potentially life-changing technology, which could widen the gap in health outcomes between those who can afford the devices and those who cannot.

The physical discomfort reported by young people living with type 1 diabetes could affect the wearing of the sensors consistently, thereby affecting how well the CGMs work. This issue of discomfort is also supported by other research, which has found that some users experience irritation or discomfort from the sensors, especially after wearing them for several days [85,97,102]. For young people who are already dealing with the challenges of managing a chronic condition, this additional discomfort can be discouraging and may lead to inconsistent use of the device.

The study found that young people felt uncomfortable in social situations using the CGMs. The reason for this finding could be that participants were not pleased and felt awkward or embarrassed with the questions people asked them about the device, or stared at them. This social stigma can deter young people living with T1D from using the CGMs. This social stigma can be a significant challenge for some young persons who might already have ill feelings about their peers because of their health condition. This social discomfort is a significant issue that calls on healthcare professionals to help educate the general public to refrain from stigmatization to enable young people living with T1D to use their CGMs effectively to help monitor their glucose levels. Hence, if they are embarrassed about wearing the device, they might avoid using it in public or even stop using it altogether. And if it does happen, it can lead to poorer management of diabetes and increased health risks. Addressing this social challenge will be crucial for ensuring that young people living with T1D feel comfortable and confident to use their CGMs in all aspects of their endeavors. This finding corroborated a previous study, which found that the curiosity of others can make CGMs feel uncomfortable and potentially limit their social interactions with others [103].

## Conclusion

The findings of this study demonstrate that CGM devices offer significant benefits, particularly in improving glucose management and reducing the frequency of hyperglycemic and hypoglycemic episodes. Participants reported feeling they were in control of their diabetes, as the real-time feedback provided by CGMs allowed them to make more informed decisions about their insulin use, diet, and physical activities. This sense of control contributed to an improved quality of life, as participants were able to engage in daily activities with less anxiety about their blood sugar levels.

However, the study also revealed some challenges associated with CGM use. The high cost of CGM devices and sensors was a major barrier for many participants, making it difficult for them to use the technology consistently. Technical issues such as device malfunctions and the need to stay within proximity to the sensor were also reported as significant challenges. Additionally, the social stigma associated with wearing a visible medical device was a concern for some participants leading to feelings of self-consciousness and discomfort in social situations.

### Limitations of the study

This study has a few limitations which are; a small sample size, geographic limitation, and limited duration. The study only included ten participants. While we gained detailed insights from these participants, the small number of participants means that the findings might not apply to all young people with Type 1 diabetes in Ghana. The experiences of these ten individuals might not represent everyone else's experiences. Also, the study was conducted only in Accra and Kumasi, two large cities in Ghana. These cities may have better access to healthcare and resources than rural areas. So, the findings might not reflect the experiences of young people living in smaller towns or villages, where managing diabetes could be even more challenging. The study was also conducted over a short period. Because of this, we might not have captured how the participants' experiences with CGM devices change over time. This study provides useful insights into how CGM devices are used by young people living with T1D in Ghana, these limitations suggest that the findings should be interpreted with some caution. Future studies could include more participants from different areas and take place over a longer period.



**Citation:** Yeboah DA, Boakye AE, Tekpertey R. Views of Young People Living with Type 1 Diabetes on Continuous Glucose Monitor Use in Ghana. Glob J Medical Clin Case Rep. 2025:12(6):127-139. Available from: https://dx.doi.org/10.17352/2455-5282.000213

## Recommendations

For healthcare providers, this study suggests that more support and information are needed to help young people living with T1D use CGMs effectively. Providing training and ongoing support can help users overcome initial challenges and use the devices to their full potential. Additionally, making CGMs more affordable and improving their design to reduce discomfort and social stigma could help more young people living with T1D benefit from this technology.

## Recommendations for future research

Future research could explore ways to make CGMs more affordable and comfortable to use, especially in low-income settings. It could also look at strategies to reduce the social stigma associated with wearing CGMs, perhaps by developing more discreet designs or by increasing public awareness about the benefits of the technology. Additionally, studies could examine the long-term impact of CGM use on health outcomes and quality of life for young people living with T1D.

## Declaration

**Ethical approval:** The study obtained ethical clearance with ID number (UHAS-REC A./111/21-22.) from the University of Health and Allied Sciences Ethical Review Committee (UHAS-REC). This was done to ensure that the study was in accordance with ethics. This approval process ensures that the survey adheres to ethical guidelines and protects the rights of participants.

**Consent for publication:** Participants were informed that the information they provided would be used for academic purposes thus to satisfy a requirement for an undergraduate certificate and also for publication just to add to academic literature.

**Availability of data and materials:** The study made use of primary data which restricted sharing it publicly hence it contains some sensitive information about the participants. However, it can be made available upon request from the corresponding author through yiadomb587@gmail.com (Anthony Edward Boakye) University of Cape Coast, Ghana.

## Authors' contributions

Derrick Anim Yeboah Contribution: conceptualize the study, methodology, data curation, formal analysis, and writing – review & editing.

Anthony Edward Boakye Contribution: conceptualize the study, methodology, data curation, formal analysis, and writing – review & editing.

Rita Tekpertey Contribution: Writing – original draft, formal analysis, data curation, and proofreading.

## Acknowledgment

We acknowledge the participants for owning out to participate in the study which helped us to obtain the needed data for the study. We are also indebted to the field assistant for assisting in the data collection we say bravo.

## References

1. Lucier J, Mathias PM. Type 1 Diabetes. [Updated 2024 Oct 5]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025. [cited 2025 Apr 27]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK507713/

2. Kahanovitz L, Sluss PM, Russell SJ. Type 1 Diabetes - A Clinical Perspective. Point Care. 2017;16(1):37–40. Available from: https://doi.org/10.1097/poc.0000000000000125

3. Subramanian S, Baidal D. The Management of Type 1 Diabetes. [Updated 2021 May 22]. In: Feingold KR, Ahmed SF, Anawalt B, et al., editors. Endotext [Internet]. South Dartmouth (MA): MDText.com, Inc.; 2000–. [cited 2025 Apr 27]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK279114/

4. Reynolds A, Mitri J. Dietary Advice For Individuals with Diabetes. [Updated 2024 Apr 28]. In: Feingold KR, Ahmed SF, Anawalt B, et al., editors. Endotext [Internet]. South Dartmouth (MA): MDText.com, Inc.; 2000–. [cited 2025 Apr 27]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK279012/

5. Adhikari M, Devkota HR, Cesuroglu T. Barriers to and facilitators of diabetes self-management practices in Rupandehi, Nepal- multiple stakeholders' perspective. BMC Public Health. 2021;21:1269. Available from: https://doi.org/10.1186/s12889-021-11308-4

6. Maina PM, Pienaar M, Reid M. Self-management practices for preventing complications of type II diabetes mellitus in low and middle-income countries: A scoping review. Int J Nurs Stud Adv. 2023;5:100136. Available from: https://doi.org/10.1016/j.ijnsa.2023.100136

7. Dowou RK, Amu H, Bain LE, Saah FI, Arthur LE, Tarkang EE. Management of chronic non-communicable diseases: qualitative study of the practices and challenges in the Volta Region, Ghana. J Glob Health Sci. 2024;6(1):e1. Available from: https://doi.org/10.35500/jghs.2024.6.e1

8. Avogo WA. Community characteristics and the risk of non-communicable diseases in Ghana. PLOS Glob Public Health. 2023;3(1):e0000692. Available from: https://doi.org/10.1371/journal.pgph.0000692

9. International Diabetes Federation. Type 1 diabetes. Brussels: IDF; 2022. [cited 2025 Apr 28]. Available from: https://idf.org/about-diabetes/types-of-diabetes/type-1-diabetes/

10. Niechciał E, Michalak M, Skowrońska B, Fichna P. Increasing trend of childhood type 1 diabetes incidence: 20-year observation from Greater Poland Province, Poland. Acta Diabetol. 2024;61:1609–1617. Available from: https://doi.org/10.1007/s00592-024-02339-5

11. Stene LC, Norris JM, Rewers MJ. Risk Factors for Type 1 Diabetes. 2023 Dec 20. In: Lawrence JM, Casagrande SS, Herman WH, et al., editors. Diabetes in America [Internet]. Bethesda (MD): National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK); 2023–. [cited 2025 Apr 28]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK597412/

12. Zorena K, Michalska M, Kurpas M, Jaskulak M, Murawska A, Rostami S. Environmental Factors and the Risk of Developing Type 1 Diabetes—Old Disease and New Data. Biology (Basel). 2022;11(4):608. Available from: https://doi.org/10.3390/biology11040608

13. Ali O. Type 1 Diabetes Mellitus: Epidemiology, Genetics, Pathogenesis, and Clinical Manifestations. In: Poretsky L, editor. Principles of Diabetes Mellitus. Cham: Springer; 2015. Available from: https://doi.org/10.1007/978-3-319-20797-1_12-1

14. Quinn LM, Wong FS, Narendran P. Environmental Determinants of Type 1 Diabetes: From Association to Proving Causality. Front Immunol. 2021;12:737964. Available from: https://doi.org/10.3389/fimmu.2021.737964



**Citation:** Yeboah DA, Boakye AE, Tekpertey R. Views of Young People Living with Type 1 Diabetes on Continuous Glucose Monitor Use in Ghana. Glob J Medical Clin Case Rep. 2025:12(6):127-139. Available from: https://dx.doi.org/10.17352/2455-5282.000213

15. Zysberg L, Lang T. Supporting parents of children with type 1 diabetes mellitus: a literature review. Patient Intell. 2025;7:21–31. Available from: https://doi.org/10.2147/PI.S77566

16. Houeiss P, Luce S, Boitard C. Environmental Triggering of Type 1 Diabetes Autoimmunity. Front Endocrinol (Lausanne). 2022;13:933965. Available from: https://doi.org/10.3389/fendo.2022.933965

17. Sims EK, Besser REJ, Dayan C, Rasmussen CG, Greenbaum C, Griffin KJ, et al. Screening for Type 1 Diabetes in the General Population: A Status Report and Perspective. Diabetes. 2022;71(4):610–623. Available from: https://doi.org/10.2337/dbi20-0054

18. Simmons KM, Sims EK. Screening and Prevention of Type 1 Diabetes: Where Are We? J Clin Endocrinol Metab. 2023;108(12):3067–3079. Available from: https://doi.org/10.1210/clinem/dgad328

19. Phillip M, Achenbach P, Addala A, Albanese-O'Neill A, Battelino T, Bell KJ, et al. Consensus guidance for monitoring individuals with islet autoantibody-positive pre-stage 3 type 1 diabetes. Diabetologia. 2024;67:1731–1759. Available from: https://doi.org/10.1007/s00125-024-06205-5

20. Yeh PT, Kennedy CE, Rhee DK, Zera C, Tunçalp Ö, Lucido B, et al. Self-monitoring of blood glucose levels among pregnant individuals with gestational diabetes: a systematic review and meta-analysis. Front Glob Womens Health. 2023;4:1006041. Available from: https://doi.org/10.3389/fgwh.2023.1006041

21. Weinstock RS, Aleppo G, Bailey TS, Bergenstal RM, Fisher WA, Greenwood DA, et al. The Role of Blood Glucose Monitoring in Diabetes Management. Arlington (VA): American Diabetes Association; 2020. [cited 2025 Apr 28]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK566165/

22. Rao PV, Makkar BM, Kumar A, Das AK, Singh AK, Mithal A, et al. RSSDI consensus on self-monitoring of blood glucose in types 1 and 2 diabetes mellitus in India. Int J Diabetes Dev Ctries. 2018;38:260–279. Available from: https://doi.org/10.1007/s13410-018-0677-3

23. Reddy N, Verma N, Dungan K. Monitoring Technologies—Continuous Glucose Monitoring, Mobile Technology, Biomarkers of Glycemic Control. [Updated 2023 Jul 8]. In: Feingold KR, Ahmed SF, Anawalt B, et al., editors. Endotext [Internet]. South Dartmouth (MA): MDText.com, Inc.; 2000–. [cited 2025 Apr 28]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK279046/

24. Ewen M, Lepeska M, Abdraimova A, Besançon S, Cham NTP, Dunganova A, et al. Availability, prices and affordability of self-monitoring blood glucose devices: surveys in six low-income and middle-income countries. BMJ Public Health. 2025;3:e001128. Available from: [DOI currently not available; check journal site]

25. Gabbay MAL, Rodacki M, Calliari LE, Vianna AGD, Krakauer M, Pinto MS, et al. Time in range: a new parameter to evaluate blood glucose control in patients with diabetes. Diabetol Metab Syndr. 2020;12:22. Available from: https://doi.org/10.1186/s13098-020-00529-z

26. Abubeker KM, Ramani R, Krishnamoorthy R, Gogula S, Baskar S, Muthu S, et al. Internet of Things enabled open source assisted real-time blood glucose monitoring framework. Sci Rep. 2024;14:6151. Available from: https://doi.org/10.1038/s41598-024-56677-z

27. Dey K, Santra TS, Tseng FG. Advancements in Glucose Monitoring: From Traditional Methods to Wearable Sensors. Appl Sci. 2025;15(5):2523. Available from: https://doi.org/10.3390/app15052523

28. Mittal R, Koutras N, Maya J, Lemos JRN, Hirani K. Blood glucose monitoring devices for type 1 diabetes: a journey from the food and drug administration approval to market availability. Front Endocrinol (Lausanne). 2024;15:1352302. Available from: https://doi.org/10.3389/fendo.2024.1352302

29. Mathew TK, Zubair M, Tadi P. Blood Glucose Monitoring. [Updated 2023 Apr 23]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan–. [cited 2025 Apr 28]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK555976/

30. Krakauer M, Botero JF, Lavalle-González FJ, Proietti A, Barbieri DE. A review of flash glucose monitoring in type 2 diabetes. Diabetol Metab Syndr. 2021;13:42. Available from: https://doi.org/10.1186/s13098-021-00654-3

31. Ribet F, Stemme G, Roxhed N. Real-time intradermal continuous glucose monitoring using a minimally invasive microneedle-based system. Biomed Microdevices. 2018;20:101. Available from: https://doi.org/10.1007/s10544-018-0349-6

32. Friedman JG, Cardona Matos Z, Szmuilowicz ED, Aleppo G. Use of Continuous Glucose Monitors to Manage Type 1 Diabetes Mellitus: Progress, Challenges, and Recommendations. Pharmgenomics Pers Med. 2023;16:263–276. Available from: https://doi.org/10.2147/pgpm.s374663

33. Mazzotta FA, Lucaccini Paoli L, Rizzi A, Tartaglione L, Leo ML, Popolla V, et al. Unmet needs in the treatment of type 1 diabetes: why is it so difficult to achieve an improvement in metabolic control? Nutr Diabetes. 2024;14:58. Available from: https://doi.org/10.1038/s41387-024-00319-w

34. Sakar K, Cinar N. Hypoglycemia in Type 1 Diabetes Mellitus. IntechOpen; 2024. Available from: https://www.intechopen.com/chapters/1151359

35. Glocker V, Bachmann S, Hess M, Szinnai G, Burckhardt M-A. Fear of hypoglycemia and quality of life in young people with type 1 diabetes and their parents in the era of sensor glucose monitoring. Front Endocrinol (Lausanne). 2022;13:958671. Available from: https://doi.org/10.3389/fendo.2022.958671

36. Hermanns N, Heinemann L, Freckmann G, Waldenmaier D, Ehrmann D. Impact of CGM on the Management of Hypoglycemia Problems: Overview and Secondary Analysis of the HypoDE Study. J Diabetes Sci Technol. 2019;13(4):636–644. Available from: https://doi.org/10.1177/1932296819831695

37. Flockhart M, Larsen FJ. Continuous Glucose Monitoring in Endurance Athletes: Interpretation and Relevance of Measurements for Improving Performance and Health. Sports Med. 2024;54:247–255. Available from: https://doi.org/10.1007/s40279-023-01910-4

38. Klonoff DC, Nguyen KT, Xu NY, Gutierrez A, Espinoza JC, Vidmar AP. Use of Continuous Glucose Monitors by People Without Diabetes: An Idea Whose Time Has Come? J Diabetes Sci Technol. 2023;17(6):1686–1697. Available from: https://doi.org/10.1177/19322968221110830

39. Klupa T, Czupryniak L, Dzida G, Fichna P, Jarosz-Chobot P, et al. Expanding the Role of Continuous Glucose Monitoring in Modern Diabetes Care Beyond Type 1 Disease. Diabetes Ther. 2023;14:1241–1266. Available from: https://doi.org/10.1007/s13300-023-01431-3

40. Reaven PD, Newell M, Rivas S, Zhou X, Norman GJ, Zhou JJ. Initiation of Continuous Glucose Monitoring Is Linked to Improved Glycemic Control and Fewer Clinical Events in Type 1 and Type 2 Diabetes in the Veterans Health Administration. Diabetes Care. 2023;46(4):854–863. Available from: https://doi.org/10.2337/dc22-2189

41. Phillip M, Danne T, Shalitin S, Buckingham B, Laffel L, Tamborlane W, Battelino T, for the F.T.C.F. Participants. Use of continuous glucose monitoring in children and adolescents. Pediatr Diabetes. 2012;13:215–228. Available from: https://doi.org/10.1111/j.1399-5448.2011.00849.x

42. Głowińska-Olszewska B, Tobiaszewska M, Łuczyński W, Bossowski A. Monthly use of a real-time continuous glucose monitoring system as an educational and motivational tool for poorly controlled type 1 diabetes adolescents. Adv Med Sci. 2013;58:344–352. Available from: https://pubmed.ncbi.nlm.nih.gov/?term=Tobiaszewska+M&cauthor_id=23917476

43. Alfadhli E, Osman E, Basri T. Use of a real time continuous glucose monitoring system as an educational tool for patients with gestational diabetes. Diabetol Metab Syndr. 2016;8:48. Available from: https://doi.org/10.1186/s13098-016-0161-5



**Citation:** Yeboah DA, Boakye AE, Tekpertey R. Views of Young People Living with Type 1 Diabetes on Continuous Glucose Monitor Use in Ghana. Glob J Medical Clin Case Rep. 2025:12(6):127-139. Available from: https://dx.doi.org/10.17352/2455-5282.000213

44. Rivera-Ávila DA, Esquivel-Lu AI, Salazar-Lozano CR, Jones K, Doubova SV. The effects of professional continuous glucose monitoring as an adjuvant educational tool for improving glycemic control in patients with type 2 diabetes. BMC Endocr Disord. 2021;21:79. Available from: https://doi.org/10.1186/s12902-021-00742-5

45. Sawyer B, Hilliard E, Hackney KJ, Stastny S. Barriers and Strategies for Type 1 Diabetes Management Among Emerging Adults: A Qualitative Study. Clin Med Insights Endocrinol Diabetes. 2022;15:11795514221098389. Available from: https://doi.org/10.1177/11795514221098389

46. Agarwal S, Simmonds I, Myers AK. The Use of Diabetes Technology to Address Inequity in Health Outcomes: Limitations and Opportunities. Curr Diab Rep. 2022;22(7):275–281. Available from: https://doi.org/10.1007/s11892-022-01470-3

47. Holt RIG, DeVries JH, Hess-Fischl A, Hirsch IB, Kirkman MS, Klupa T, et al. The management of type 1 diabetes in adults. A consensus report by the American Diabetes Association (ADA) and the European Association for the Study of Diabetes (EASD). Diabetologia. 2021;64(12):2609–2652. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC8481000/

48. Klonoff AN, Lee WA, Xu NY, Nguyen KT, DuBord A, Kerr D. Six Digital Health Technologies That Will Transform Diabetes. J Diabetes Sci Technol. 2021;17(1):239–249. Available from: https://doi.org/10.1177/19322968211043498

49. Fleming GA, Petrie JR, Bergenstal RM, Holl RW, Peters AL, Heinemann L, et al. Diabetes digital app technology: benefits, challenges, and recommendations. A consensus report by the European Association for the Study of Diabetes (EASD) and the American Diabetes Association (ADA) Diabetes Technology Working Group. Diabetologia. 2020;63:229–241. Available from: https://doi.org/10.1007/s00125-019-05034-1

50. Jacobsen LM, Sherr JL, Considine E, Chen A, Peeling SM, Hulsmans M, et al. Utility and precision evidence of technology in the treatment of type 1 diabetes: a systematic review. Commun Med. 2023;3:132. Available from: https://doi.org/10.1038/s43856-023-00358-x

51. Friedman JG, Cardona Matos Z, Szmuilowicz ED, Aleppo G. Use of Continuous Glucose Monitors to Manage Type 1 Diabetes Mellitus: Progress, Challenges, and Recommendations. Pharmgenomics Pers Med. 2023;16:263–276. Available from: https://doi.org/10.2147/pgpm.s374663

52. Rubelj K, Stipančić G, La Grasta Sabolić L, Požgaj Šepec M. Continuous Glucose Monitoring and Type 1 Diabetes Mellitus Control in Child, Adolescent and Young Adult Population - Arguments for Its Use and Effects. Acta Clin Croat. 2021;60(4):609–616. Available from: https://doi.org/10.20471/acc.2021.60.04.07

53. Holt RIG, DeVries JH, Hess-Fischl A, Hirsch IB, Kirkman MS, Klupa T, et al. The management of type 1 diabetes in adults. A consensus report by the American Diabetes Association (ADA) and the European Association for the Study of Diabetes (EASD). Diabetologia. 2021;64:2609–2652. Available from: https://doi.org/10.1007/s00125-021-05568-3

54. Chetty T, Shetty V, Fournier PA, Adolfsson P, Jones TW, Davis EA. Exercise Management for Young People With Type 1 Diabetes: A Structured Approach to the Exercise Consultation. Front Endocrinol (Lausanne). 2019;10:326. Available from: https://doi.org/10.3389/fendo.2019.00326

55. Deeb A, Ziaullah M, Akle M, Strauss K. Utilization and Challenges of Continuous Glucose Monitoring in Sensor-Augmented Pump Therapy: A Patient Experience Analysis. J Diabetes Sci Technol. 2018;13(1):146–147. Available from: https://doi.org/10.1177/1932296818801361

56. Prahalad P, Addala A, Buckingham BA, Wilson DM, Maahs DM. Sustained Continuous Glucose Monitor Use in Low-Income Youth with Type 1 Diabetes Following Insurance Coverage Supports Expansion of Continuous Glucose Monitor Coverage for All. Diabetes Technol Ther. 2018;20(9):632–634. Available from: https://doi.org/10.1089/dia.2018.0204

57. Owusu BA, Doku DT. Living with type 1 diabetes and schooling among young people in Ghana: a truism of health selection, inadequate support, or artefactual explanation of educational inequalities? BMC Public Health. 2024;24:1137. Available from: https://doi.org/10.1186/s12889-024-18590-y

58. Prahalad P, Addala A, Buckingham BA, Wilson DM, Maahs DM. Sustained Continuous Glucose Monitor Use in Low-Income Youth with Type 1 Diabetes Following Insurance Coverage Supports Expansion of Continuous Glucose Monitor Coverage for All. Diabetes Technol Ther. 2018;20(9):632–634. Available from: https://doi.org/10.1089/dia.2018.0204

59. Letitia W, Elmarí D, Esmé VR, Sega D. Continuous glucose monitoring empowers adolescents to take responsibility of diabetes management. Afr J Prim Health Care Fam Med. 2023;15(1):3879. Available from: https://doi.org/10.4102/phcfm.v15i1.3879

60. Tanlaka E, Aryal S. Interpretivist Constructivism: A Valuable Approach for Qualitative Nursing Research. Open J Ther Rehabil. 2025;13:8–19. Available from: https://doi.org/10.4236/ojtr.2025.131002

61. Levers MJD. Philosophical Paradigms, Grounded Theory, and Perspectives on Emergence. SAGE Open. 2013;3(4). Available from: https://doi.org/10.1177/2158244013517243

62. Wijk I, Amsberg S, Andreassen Gleissman S, Toft E, Anderbro T, Johansson UB, et al. Living with Type 1 Diabetes as Experienced by Adults with Prolonged Elevated HbA1c: A Qualitative Study. Diabetes Ther. 2023;14:1673–1684. Available from: https://doi.org/10.1007/s13300-023-01443-z

63. Capili B. Cross-Sectional Studies. Am J Nurs. 2021;121(10):59–62. Available from: https://doi.org/10.1097/01.naj.0000794280.73744.fe

64. Wang X, Cheng Z. Cross-Sectional Studies: Strengths, Weaknesses, and Recommendations. Chest. 2020;158(1S):S65–S71. Available from: https://doi.org/10.1016/j.chest.2020.03.012

65. King E. Chronic Illness and Functionality: How It Affects Adolescents Academically and Socially and How They Can Cope. Intuition (BYU Undergrad J Psychol). 2017;12(2):8. Available from: https://scholarsarchive.byu.edu/intuition/vol12/iss2/8

66. Wood D, Crapnell T, Lau L, Bennett A, Lotstein D, Ferris M, et al. Emerging Adulthood as a Critical Stage in the Life Course. In: Halfon N, Forrest C, Lerner R, Faustman E, editors. Handbook of Life Course Health Development. Cham: Springer; 2018. Available from: https://doi.org/10.1007/978-3-319-47143-3_7

67. Russo K. Assessment and Treatment of Adolescents With Chronic Medical Conditions. J Health Serv Psychol. 2022;48(2):69–78. Available from: https://doi.org/10.1007/s42843-022-00059-4

68. Robinson RS. Purposive Sampling. In: Michalos AC, editor. Encyclopedia of Quality of Life and Well-Being Research. Dordrecht: Springer; 2014. Available from: https://doi.org/10.1007/978-94-007-0753-5_2337

69. Palinkas LA, Horwitz SM, Green CA, Wisdom JP, Duan N, Hoagwood K. Purposeful Sampling for Qualitative Data Collection and Analysis in Mixed Method Implementation Research. Adm Policy Ment Health. 2015;42(5):533–544. Available from: https://doi.org/10.1007/s10488-013-0528-y

70. Campbell S, Greenwood M, Prior S, Shearer T, Walkem K, Young S, et al. Purposive sampling: complex or simple? Research case examples. J Res Nurs. 2020;25(8):652–661. Available from: https://doi.org/10.1177/1744987120927206

71. Hennink MM, Kaiser BN, Marconi VC. Code saturation versus meaning saturation: how many interviews are enough? Qual Health Res. 2017;27(4):591–608. Available from: https://doi.org/10.1177/1049732316665344

72. DeJonckheere M, Vaughn LM. Semistructured interviewing in primary care research: a balance of relationship and rigour. Fam Med Community Health. 2019;7:e000057. Available from: https://doi.org/10.1136/fmch-2018-000057



**Citation:** Yeboah DA, Boakye AE, Tekpertey R. Views of Young People Living with Type 1 Diabetes on Continuous Glucose Monitor Use in Ghana. Glob J Medical Clin Case Rep. 2025:12(6):127-139. Available from: https://dx.doi.org/10.17352/2455-5282.000213

73. Magaldi D, Berler M. Semi-structured Interviews. In: Zeigler-Hill V, Shackelford TK, editors. Encyclopedia of Personality and Individual Differences. Cham: Springer; 2020. Available from: https://doi.org/10.1007/978-3-319-24612-3_857

74. Tenny S, Brannan JM, Brannan GD. Qualitative Study. [Updated 2022 Sep 18]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan–. Available from: https://www.ncbi.nlm.nih.gov/books/NBK470395/

75. Oranga J, Matere A. Qualitative Research: Essence, Types and Advantages. Open Access Libr J. 2023;10:1–9. Available from: http://dx.doi.org/10.4236/oalib.1111001

76. Novick G. Is there a bias against telephone interviews in qualitative research? Res Nurs Health. 2008;31(4):391–398. Available from: https://doi.org/10.1002/nur.20259

77. Drabble L, Trocki KF, Salcedo B, Walker PC, Korcha RA. Conducting qualitative interviews by telephone: Lessons learned from a study of alcohol use among sexual minority and heterosexual women. Qual Soc Work. 2016;15(1):118–133. Available from: https://doi.org/10.1177/1473325015585613

78. Topping M, Douglas J, Winkler D. General Considerations for Conducting Online Qualitative Research and Practice Implications for Interviewing People with Acquired Brain Injury. Int J Qual Methods. 2021;20. Available from: https://doi.org/10.1177/16094069211019615

79. Rankin D, Kimbell B, Allen JM, Besser REJ, Boughton CK, Campbell F, et al. Adolescents' Experiences of Using a Smartphone Application Hosting a Closed-loop Algorithm to Manage Type 1 Diabetes in Everyday Life: Qualitative Study. J Diabetes Sci Technol. 2021;15(5):1042–1051. Available from: https://doi.org/10.1177/1932296821994201

80. Rankin D, Kimbell B, Hovorka R, Lawton J. Adolescents' and their parents' experiences of using a closed-loop system to manage type 1 diabetes in everyday life: qualitative study. Chronic Illn. 2021. Available from: https://doi.org/10.1177/1742395320985924

81. Nowell LS, Norris JM, White DE, Moules NJ. Thematic Analysis: Striving to Meet the Trustworthiness Criteria. Int J Qual Methods. 2017;16(1). Available from: https://doi.org/10.1177/1609406917733847

82. Ahmed SK, Mohammed RA, Nashwan AJ, Ibrahim RH, Abdalla AQ, Ameen BMM, Khdhir RM. Using thematic analysis in qualitative research. J Med Surg Public Health. 2025;6:100198. Available from: https://doi.org/10.1016/j.glmedi.2025.100198

83. Lochmiller CR. Conducting Thematic Analysis with Qualitative Data. Qual Rep. 2021;26(6):2029–2044. Available from: https://doi.org/10.46743/2160-3715/2021.5008

84. Kiger ME, Varpio L. Thematic analysis of qualitative data: AMEE Guide No. 131. Med Teach. 2020;42(8):846–854. Available from: https://doi.org/10.1080/0142159x.2020.1755030

85. Shin M, Yang Y, Kang JH, Jin HY. Exploring the Initial Encounter with Continuous Glucose Monitoring among Individuals with Type 2 Diabetes: A Two-Week Trip. Diabetes Metab Syndr Obes. 2024;17:3521–3534. Available from: https://doi.org/10.2147/DMSO.S466734

86. Oganesova Z, Pemberton J, Brown A. Innovative solution or cause for concern? The use of continuous glucose monitors in people not living with diabetes: A narrative review. Diabet Med. 2024;41(9):e15369. Available from: https://doi.org/10.1111/dme.15369

87. Anhalt H. Limitation of continuous glucose monitor usage. Diabetes Technol Ther. 2016;18(3):115–117. Available from: https://doi.org/10.1089/dia.2016.0011

88. Abucevicz-Swick K. A Structured Diabetes Continuous Glucose Monitor Education Program to Improve Patient Knowledge and Self-Efficacy [thesis]. Morgantown (WV): West Virginia University; 2024. Graduate Theses, Dissertations, and Problem Reports. 12543. Available from: https://researchrepository.wvu.edu/etd/12543

89. Kieu A, King J, Govender RD, Östlundh L. The Benefits of Utilizing Continuous Glucose Monitoring of Diabetes Mellitus in Primary Care: A Systematic Review. J Diabetes Sci Technol. 2023;17(3):762–774. Available from: https://doi.org/10.1177/19322968211070855

90. Laffel LM, Kanapka LG, Beck RW, Bergamo K, Clements MA, Criego A, et al. Effect of Continuous Glucose Monitoring on Glycemic Control in Adolescents and Young Adults With Type 1 Diabetes: A Randomized Clinical Trial. JAMA. 2020;323(23):2388–2396. Available from: https://doi.org/10.1001/jama.2020.6940

91. Alzawahreh S, Ozturk C. The Improving Effects of Diabetes Education on Diabetes Awareness and Management in Children and Adolescents with T1DM. Open J Nurs. 2024;14:164–175. Available from: https://doi.org/10.4236/ojn.2024.144011

92. Wanjau MN, Möller H, Haigh F, Milat A, Hayek R, Lucas P, Veerman JL. Physical Activity and Depression and Anxiety Disorders: A Systematic Review of Reviews and Assessment of Causality. AJPM Focus. 2023;2(2):100074. Available from: https://doi.org/10.1016/j.focus.2023.100074

93. de Wit M, Gajewska KA, Goethals ER, McDarby V, Zhao X, Hapunda G, et al. ISPAD Clinical Practice Consensus Guidelines 2022: Psychological care of children, adolescents and young adults with diabetes. Pediatr Diabetes. 2022;23(8):1373–1389. Available from: https://doi.org/10.1111/pedi.13428

94. Mangoulia P, Milionis C, Vlachou E, Ilias I. The Interrelationship between Diabetes Mellitus and Emotional Well-Being: Current Concepts and Future Prospects. Healthcare. 2024;12(14):1457. Available from: https://doi.org/10.3390/healthcare12141457

95. Manov AE, Chauhan S, Dhillon G, Dhaliwal A, Antonio S, Donepudi A, et al. The Effectiveness of Continuous Glucose Monitoring Devices in Managing Uncontrolled Diabetes Mellitus: A Retrospective Study. Cureus. 2023;15(7):e42545. Available from: https://doi.org/10.7759/cureus.42545

96. Hohendorff J, Czupryniak L, Dzida G, Fichna P, Jarosz-Chobot P, Klupa T, et al. Novel methods of continuous glucose monitoring and telehealth in the improvement of diabetes care: a narrative review. Arch Med Sci. 2023;19(3):757–764. Available from: https://doi.org/10.5114/aoms/139025

97. Natale P, Chen S, Chow CK, Cheung NW, Martinez-Martin D, Caillaud C, et al. Patient experiences of continuous glucose monitoring and sensor-augmented insulin pump therapy for diabetes: A systematic review of qualitative studies. J Diabetes. 2023;15(12):1048–1069. Available from: https://doi.org/10.1111/1753-0407.13454

98. Ni K, Tampe CA, Sol K, Cervantes L, Pereira RI. Continuous Glucose Monitor: Reclaiming Type 2 Diabetes Self-efficacy and Mitigating Disparities. J Endocr Soc. 2024;8(8):bvae125. Available from: https://doi.org/10.1210/jendso/bvae125

99. de Jong LA, Li X, Emamipour S, van der Werf S, Postma MJ, van Dijk PR, et al. Evaluating the Cost-Utility of Continuous Glucose Monitoring in Individuals with Type 1 Diabetes: A Systematic Review of the Methods and Quality of Studies Using Decision Models or Empirical Data. Pharmacoeconomics. 2024;42:929–953. Available from: https://doi.org/10.1007/s40273-024-01388-6

100. Karakuş KE, Sakarya S, Yeşiltepe Mutlu G, Berkkan M, Muradoğlu S, Can E, et al. Benefits and Drawbacks of Continuous Glucose Monitoring (CGM) Use in Young Children With Type 1 Diabetes: A Qualitative Study From a Country Where the CGM Is Not Reimbursed. J Patient Exp. 2021;8. Available from: https://doi.org/10.1177/23743735211056523

101. Chen HC, Lai YH, Jiang YD. Overcoming barriers in continuous glucose monitoring: Challenges and future directions in diabetes management. J Diabetes Investig. 2025;16:769–774. Available from: https://doi.org/10.1111/jdi.70019



**Citation:** Yeboah DA, Boakye AE, Tekpertey R. Views of Young People Living with Type 1 Diabetes on Continuous Glucose Monitor Use in Ghana. Glob J Medical Clin Case Rep. 2025:12(6):127-139. Available from: https://dx.doi.org/10.17352/2455-5282.000213

102. Asarani NAM, Reynolds AN, Boucher SE, de Bock M, Wheeler BJ. Cutaneous Complications With Continuous or Flash Glucose Monitoring Use: Systematic Review of Trials and Observational Studies. J Diabetes Sci Technol. 2020;14(2):328–337. Available from: https://doi.org/10.1177/1932296819870849

103. Peyyety V, Zupa MF, Hewitt B, Rodriguez Gonzalez A, Mani I, Prioleau T, et al. Barriers and Facilitators to Uptake of Continuous Glucose Monitoring for Management of Type 2 Diabetes Mellitus in Youth. Sci Diabetes Self Manag Care. 2023;49(6):426–437. Available from: https://doi.org/10.1177/2635010623120503





**Citation:** Yeboah DA, Boakye AE, Tekpertey R. Views of Young People Living with Type 1 Diabetes on Continuous Glucose Monitor Use in Ghana. Glob J Medical Clin Case Rep. 2025:12(6):127-139. Available from: https://dx.doi.org/10.17352/2455-5282.000213