Comparison of Satisfaction with their Glucose Monitoring Device in Patients Using Flash Glucose Monitoring vs. Patients Using SMBG

DOI: https://doi.org/10.20378/irb-47106
URN: urn:nbn:de:bvb:473-irb-471069

Norbert Hermanns, Dominic Ehrmann, Melanie Schipfer, Thomas Haak, Bernhard Kulzer
FIDAM - Research Institute Diabetes Academy, Diabetes Center Mergentheim, Bad Mergentheim, Germany

ABSTRACT

Flash Glucose Monitoring offers several benefits to patients such as ease of use and no additional finger pricks. However, there are also some limitations that are being discussed such as perceived lack of accuracy and skin irritations. We analyzed different aspects of patients' satisfaction with Flash Glucose Monitoring (Flash) by comparing Flash users to patients who use SMBG.

We used the Glucose Monitoring Satisfaction Survey that consists of 15 items with a scale range of 1 to 5. 133 patients who were using Flash for 7.9 ± 9.5 months were compared with 83 patients who used SMBG. As a measure of between-group effect size, Cohens d was used.

In general, Flash users were significantly more satisfied with how things were going with their diabetes (*d* = 0.31; p = 0.024). SMBG users indicated that measurement takes more time to use (*d* = 0.67; p < 0.001), makes them worry more (*d* = 0.32; p = 0.024), is more of a hassle to use (*d* = 0.45; p = 0.002), and is more painful to use (*d* = 0.55; p < 0.001) when compared to Flash users. Feeling frustrated with diabetes (*d* = 0.31; p = 0.027) as well as being depressed (*d* = 0.40; p = 0.002) were scored lower by Flash users. In addition, Flash users felt less restricted by diabetes (*d* = 0.52; p < 0.001) and more spontaneous (*d* = 0.67; p < 0.001). Interestingly, there were no significant differences regarding the rating of accuracy (*d* = 0.19; p = 0.157), trusting the numbers (*d* = 0.01; p = 0.934), and skin irritations (*d* = 0.26; p = 0.053).

The comparison demonstrated that there are several perceived benefits associated with using Flash. Ease of use and gaining more flexibility or feeling less restricted were important topics for Flash users. Possible limitations of Flash were not perceived as such by the users.

BACKGROUND

Flash Glucose Monitoring (Flash) allows users to gain a more detailed view of their glucose levels by displaying the recent course of glucose as well as trend arrows indicating a possible future development; together with the ease of use it should offer several benefits compared to blood glucose measurements with finger sticks. However, possible limitations or barriers of Flash are also discussed such as perceived lack of accuracy and skin irritations.

There is a lack of data analyzing patient reported outcomes of the use of Flash. In this analysis, we compared the satisfaction with their current glucose monitoring device of Flash-users with those who perform blood-glucose measurements via finger sticks.

METHODS

Participants were recruited as part of an RCT evaluating a newly developed education program for Flash. At baseline, 133 participants already used Flash (Flash-users) for a mean time of 7.9 ± 9.5 months. 83 participants had no experience with Flash and performed blood-glucose measurements via finger pricks (SMBG-users). For this analysis, these two groups were compared.

Satisfaction with the current glucose-monitoring method was assessed via the Glucose Monitoring Satisfaction Survey (GMSS)[1]. The GMSS consists of 15 items with responses ranging from "1 – strongly disagree" to "5 – strongly agree". An overall satisfaction score as well as scores for 4 subscales can be computed:

- Openness: sense of liberation and/or perceived reduction in feeling restricted due to glucose monitoring method
- Emotional burden: emotional stresses and strains of glucose monitoring method
- Behavioral burden: day-to-day bother and annoyance associated with glucose monitoring method
- Trust: perceived reliability of the monitor and the sense of confidence that the results were accurate.

RESULTS

Sample characteristics (Table 1):

- Flash-users were significantly younger than SMBG-users.
- A1c of both groups was comparable.
- Flash-users still performed 4.2 blood-glucose measurements per day, while SMBG-users performed 4.9 blood-glucose measurements per day.

Overall-satisfaction and subscales (Figure 1):

- Overall, Flash-users were more satisfied with their monitoring device than SMBG-users (3.9 vs. 3.5; Δ= 0.4; 95% CI 0.2 to 0.6; p < 0.01).
- Flash-users reported a greater Openness than SMBG-users (3.7 vs. 3.2; Δ = 0.5; 95% CI 0.3 to 0.7; p < 0.001).
- SMBG-users reported greater Emotional burden (2.1 vs. 2.4; Δ= -0.3; 95% CI -0.1 to -0.5; p = 0.013) and greater Behavioral burden (1.9 vs. 2.5; Δ= -0.6; 95% CI -0.3 to -0.8; p < 0.01) than Flash-users.
- With regard to Trust, there were no significant differences between Flash-users and SMBG-users (4.0 vs. 3.9;Δ= 0.1; 95% CI -0.1 to 0.3; p = 0.372).

Single-item analyses:

- Openness (Figure 2): Differences between the two groups were greatest for the items "be more spontaneous" (effect size of difference between the two groups *d* = 0.67; p < 0.001) and „feel less restricted" (*d* = 0.52; p < 0.001).
- Emotional burden (Figure 3): The items „worry a lot" (*d* = 0.32; p = 0.024) and „feel more down and depressed" (*d* = 0.40; p = 0.002) had the highest effect sizes.
- Behavioral burden (Figure 4): The items „too much time to use" (*d* = 0.67; p < 0.001) and „too painful to use" (*d* = 0.55; p < 0.001) led to more agreement with SMBG-users.
- Trust (Figure 5): No differences were found for any item.

CONCLUSIONS

The use of Flash was associated with perceived benefits compared to the traditional SMBG-method that were expressed through a greater spontaneity, feeling less burdened and ease of use. Interestingly, both groups showed a comparable trust and confidence in the displayed numbers of their device.

It should be noted that the SMBG-users recruited for the RCT also had an initial interest in using Flash.

Overall, it could be demonstrated that Flash-users are more satisfied with their monitoring device than SMBG-users. Especially the effects on the Emotional burden items are of interest and indicate possible effects on quality of life.

The development of the education program was supported by Abbott Diabetes Care Germany.

[1] Polonsky, W. H., Fisher, L., Hessler, D., & Edelman, S. V. (2015). Development of a New Measure for Assessing Glucose Monitoring Device-Related Treatment Satisfaction and Quality of Life. Diabetes Technol.Ther., 17(9), 657-663.

Table 1: Sample Characteristics

M ± SD; %	Flash-users (n = 133)	SMBG-users (n = 83)	p
Age (years)	44.3 ± 13.5	48.3 ± 14.1	.044
Sex	52.6 % female	50.0 % female	.707
BMI (kg/m²)	27.6 ± 5.3	28.7 ± 4.9	.113
Type of diabetes	86.5 % Type 1 12.0 % Type 2 1.5 % other	82.1 % Type 1 17.9 % Type 2 0.0 % other	.272
Diabetes duration (years)	20.1 ± 11.4	19.8 ± 9.4	.828
A1c (%)	8.4 ± 1.0	8.4 ± 0.9	.889
% with insulin pump therapy	42.9 %	31.0 %	.075
# of self-monitored blood-glucose measurements per day	4.2 ± 2.3	4.9 ± 1.5	.027

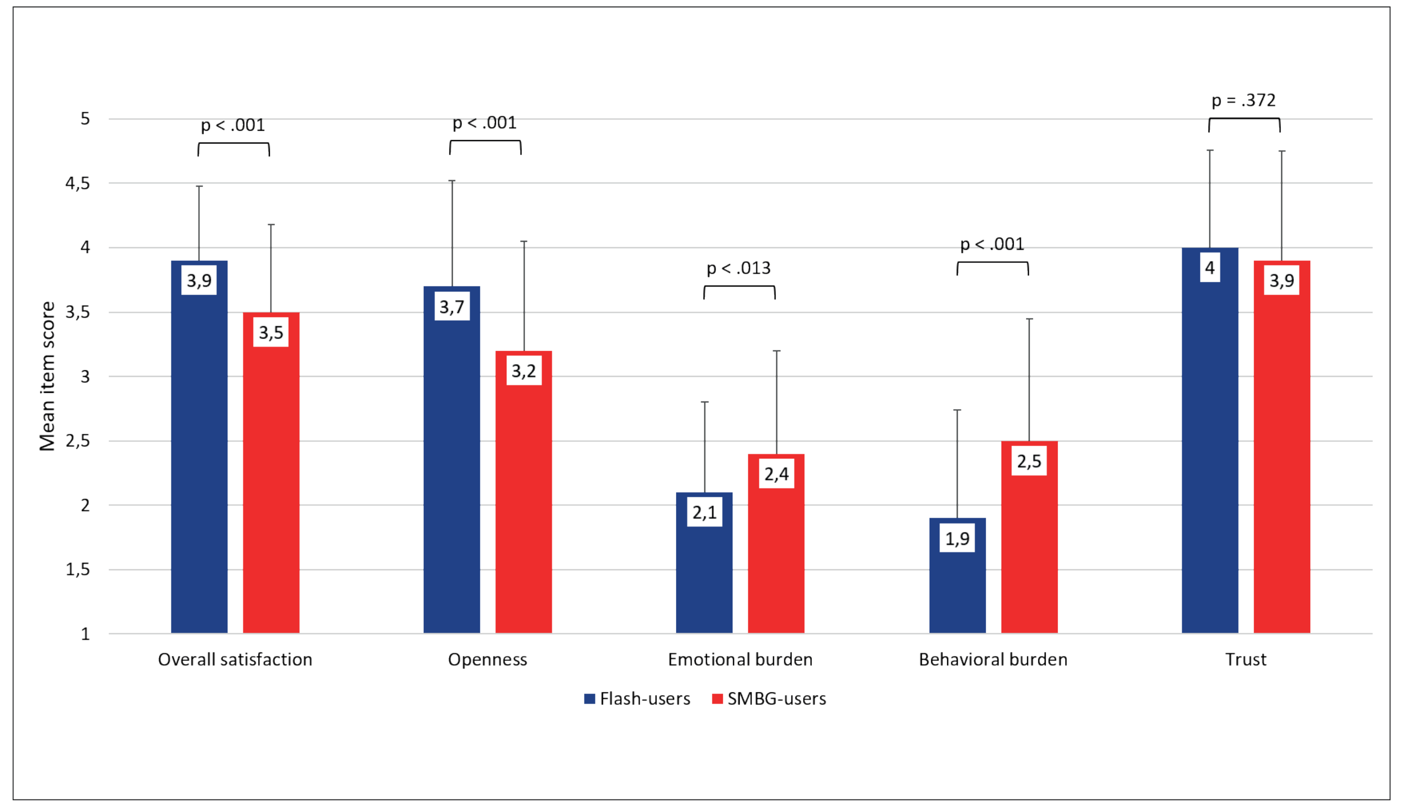

Figure 1: Differences in satisfaction with the glucose-monitoring device between Flash-users and SMBG-users

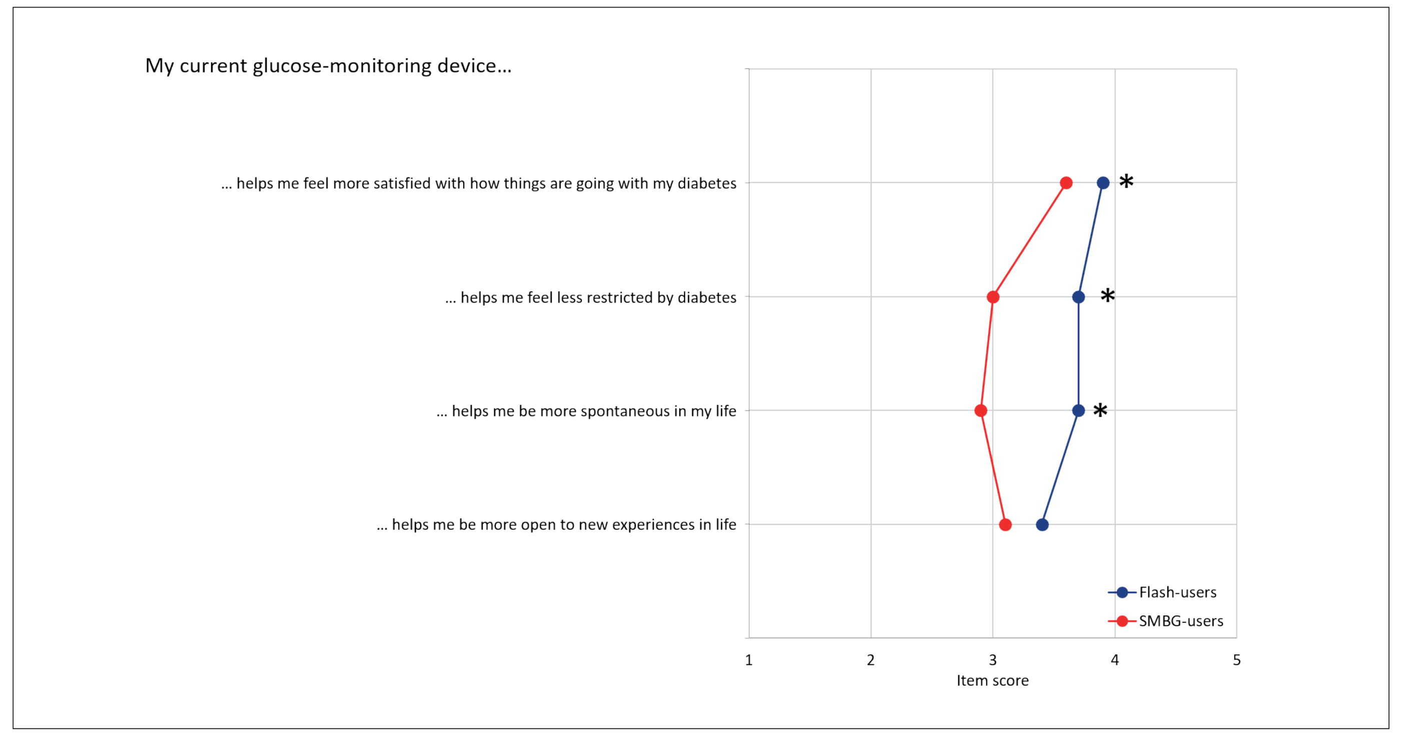

Figure 2: Subscale „Openness": Differences in responses to each item of this subscale of the GMSS between Flash-users and SMBG-users. * p < .05

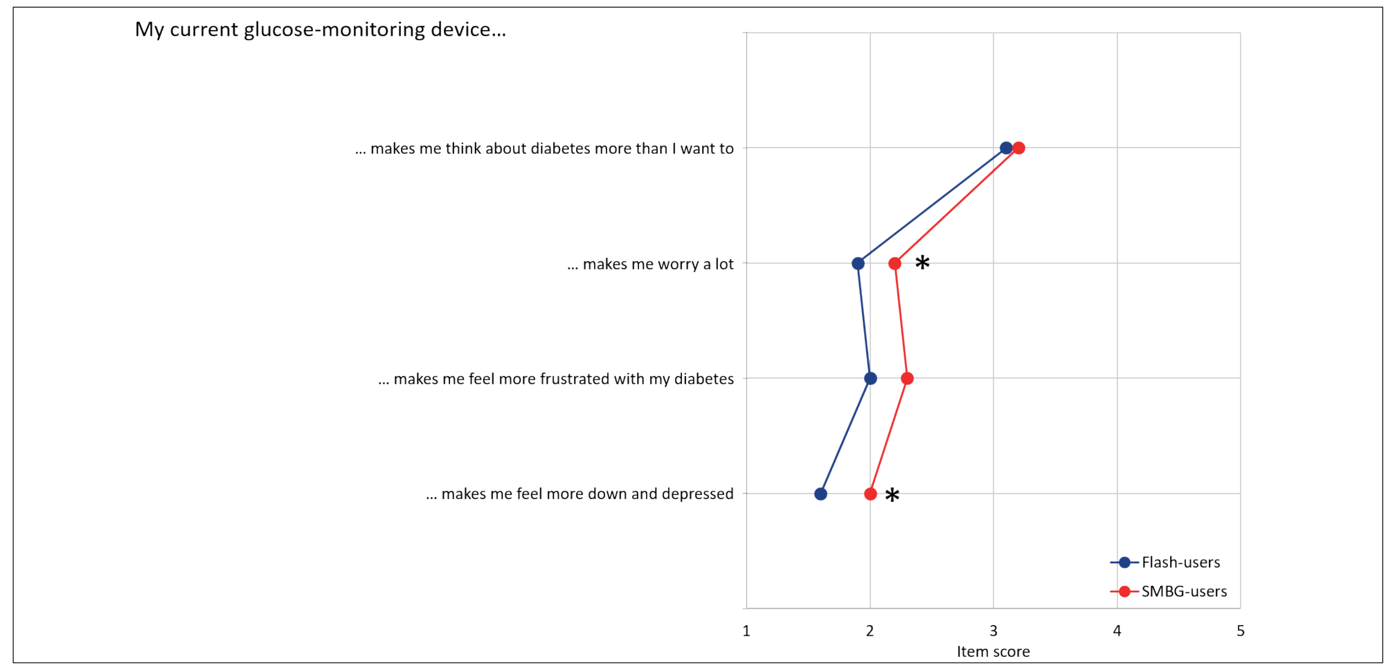

Figure 3: Subscale "Emotional burden": Differences in responses to each item of this subscale of the GMSS between Flash-users and SMBG-users. * p < .05

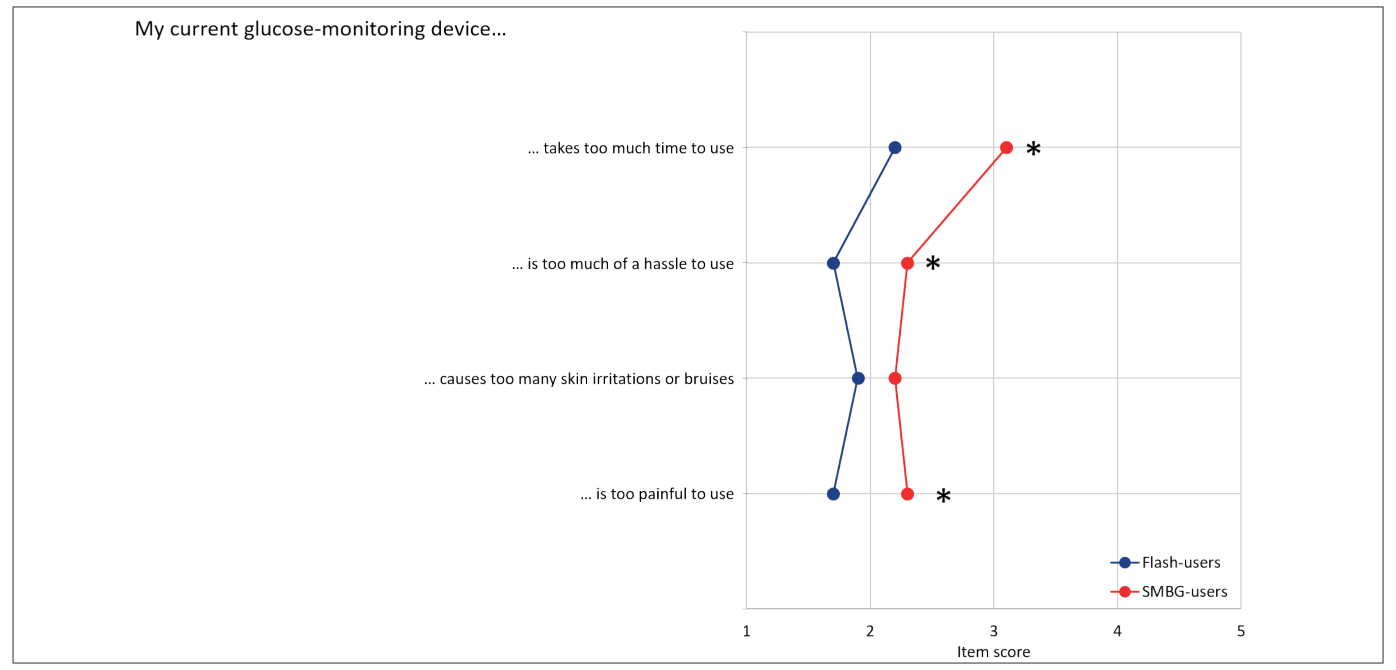

Figure 4: Subscale „Behavioral burden": Differences in responses to each item of this subscale of the GMSS between Flash-users and SMBG-users. * p < .05

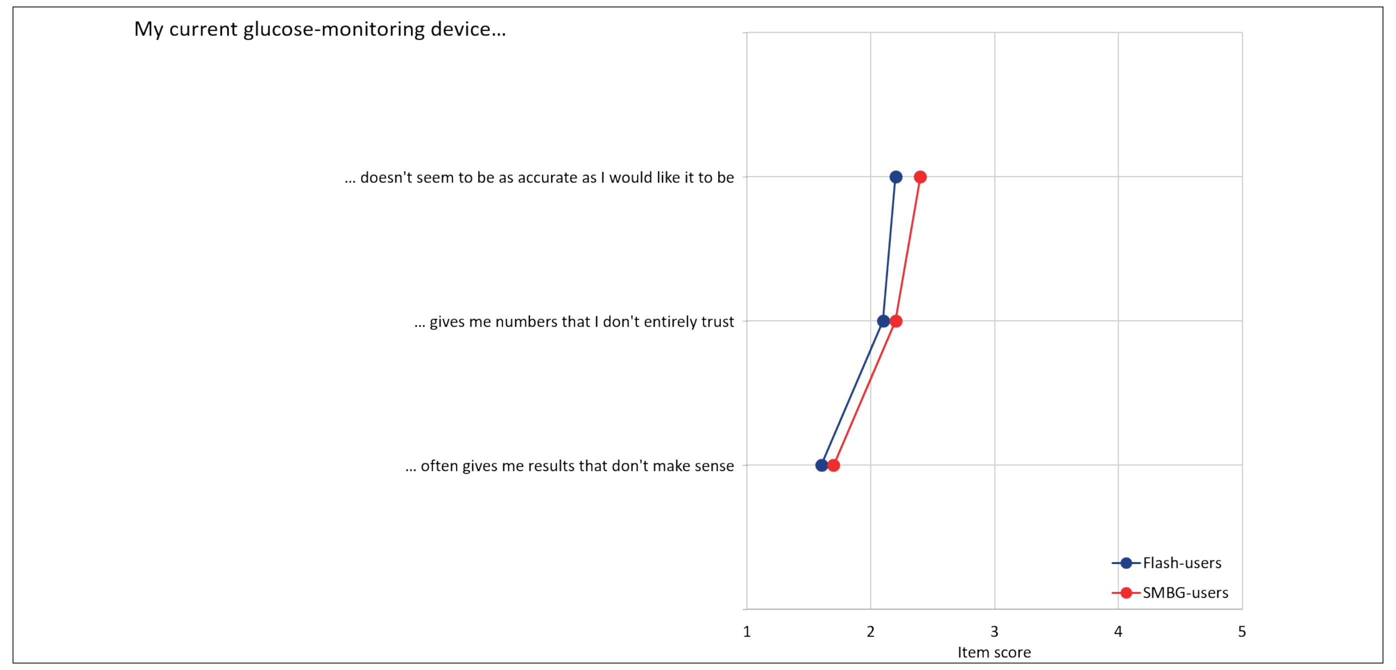

Figure 5: Subscale „Trust": Differences in responses to each item of this subscale of the GMSS between Flash-users and SMBG-users. * p < .05

Contact Information

FIDAM - Research Institute Diabetes Academy Mergentheim
Norbert Hermanns
97980 Bad Mergentheim, Germany
Phone: +49 7931 594-553
hermanns@fidam.de