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LETTER

Response to: Remote Diabetic Foot Temperature Monitoring for Early Detection of Diabetic Foot Ulcers: A Cost-Effectiveness Analysis [Letter]

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Dear editor

We read with pleasure the recent article in your journal on the cost-effectiveness of remote diabetic foot temperature monitoring by Brooks et al.[1] Diabetic foot ulcers pose a major healthcare burden, and insight into cost-effectiveness of treatments in this field is scarce, especially in preventing foot ulcers.[2] Studies with original data are clearly preferred to inform clinicians, researchers and policy-makers on the potential cost-savings and health gains of preventative interventions. But modelling analyses such as by Brooks et al can provide relevant insights.

For modelling analyses to be meaningful, assumptions must be based on both published evidence and clinical reasoning, and must be reasonable and logical. For a cost-effectiveness analysis on remote foot temperature monitoring, two assumptions are key: the potential effectiveness of the intervention, ie the number or percentage of (recurrent) ulcers prevented, and the treatment costs of one ulcer. Unfortunately, both assumptions made by Brooks et al are skewed towards finding positive outcomes on the intervention.

Regarding the potential effectiveness, the authors set the probability of ulcer recurrence in standard care at 40%, in line with current literature. However, an expected 19% re-ulceration in people who remotely monitor their temperature suggests a potential effect size >50%. While this aligns with data from studies from the 2000s, the two recent trials on this topic both show effect sizes around 25%.[3,4] Further, recurrence rate estimates made by Brooks et al[1] for people non-adherent to temperature monitoring were similar to standard care (i.e. 40%), while these are likely higher, as non-adherence to temperature monitoring will be associated with general non-adherence to preventative treatment. As such, the assumptions made in the study by Brooks et al[1] are probably overestimations of the potential effectiveness of temperature monitoring.

Regarding the costs of ulcer treatment, an estimated 13 months average healing time for each ulcer is used, based on a paper that is almost 20 years old. This is an overestimation of costs for ulcer treatment, as it suggests an average >30,000 USD for each ulcer that develops. Recent studies consistently show average ulcer costs around 10,000 USD.[5] Further, numerous observational cohort studies show median time to healing around 3 months, and one-year healing rates above 70%, indicating that 13 months average healing time is not reflecting current standard care. The restriction (in this letter) of five references and absence of a systematic review on this topic refrains us from referring to these studies. We are happy to provide these upon request.

Taken together, this means that the effectiveness of remote temperature monitoring is likely half as good as the authors modelled, while the costs related to each ulcer prevented are likely three times lower. For cost-effectiveness analyses, that suggests a six-fold reduction of potential effects, and a high likelihood that a device costing 1500 USD is not cost-effective.

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An upcoming cost-effectiveness study using empirical data based on our RCT[4] is forthcoming. Awaiting these results, modelling studies are needed, but should make realistic assumptions based on recent evidence, and should include sensitivity analyses with ranges of (realistic) assumptions.

Disclosure

The authors report no conflicts of interest in this communication.

References

1. Brooks E, Burns M, Ma R, Scholten HJ, Becker S. Remote diabetic foot temperature monitoring for early detection of diabetic foot ulcers: a cost-effectiveness analysis. *Clinicoecon Outcomes Res*. 2021;13:873–881. doi:10.2147/CEOR.S322424
2. Bus SA, Lavery LA, Monteiro-Soares M, et al. Guidelines on the prevention of foot ulcers in persons with diabetes (IWGDF 2019 update). *Diabetes Metab Res Rev*. 2020;36(Suppl 1):e3269. doi:10.1002/dmrr.3269
3. Alahakoon C, Fernando M, Galappaththy C, et al. Meta-analyses of randomized controlled trials reporting the effect of home foot temperature monitoring, patient education or offloading footwear on the incidence of diabetes-related foot ulcers. *Diabet Med*. 2020;37(8):1266–1279. doi:10.1111/dme.14323
4. Bus SA, Aan de Stegge WB, van Baal JG, Busch-Westbroek TE, Nollet F, van Netten JJ. Effectiveness of at-home skin temperature monitoring in reducing the incidence of foot ulcer recurrence in people with diabetes: a multicenter randomized controlled trial (DIATEMP). *BMJ Open Diabetes Res Care*. 2021;9(1):e002392. doi:10.1136/bmjdrc-2021-002392
5. Petrakis I, Kyriopoulos IJ, Ginis A, Athanasakis K. Losing a foot versus losing a dollar; a systematic review of cost studies in diabetic foot complications. *Expert Rev Pharmacoecon Outcomes Res*. 2017;17(2):165–180. doi:10.1080/14737167.2017.1305891

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