Reviewer's report

Title: Barriers to self-monitoring of blood glucose among adults with diabetes in an HMO

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Reviewer: Dr David Schriger

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The authors use an extant database to examine whether diabetics are filling prescriptions for glucose monitoring strips, and examine what characteristics of these patients are associated with their likelihood of obtaining strips. The paper is generally quite straightforward regarding its methods of data accrual.

1) The authors use a classical statistics logistic regression model as the primary analytic tool. This model makes a number of assumptions that are not enumerated in the limitations section and which likely bias the magnitude (but not the direction) of the associations reported in this paper. The degree to which a more robust analysis (performed by adding interaction terms to the classical analysis and/or using Bayesian methods) would improve the paper is a matter of hot theoretical debate among statisticians and epidemiologists. Readers should be aware that, to the extent that the logistic-regression-with-no-interaction-terms model is not the right model for this problem (said another way, that the assumptions of this model are not valid) the estimates may be biased AND the confidence intervals are likely too small.

Having said this, many of the associations are fairly strong and are likely to be found in any reasonable model of the problem. Therefore, I pose the above as a theoretical concern (albeit one that should be mentioned as a limitation) rather than as a harsh critique of the paper.

2) Along similar lines, the paper uses language that elevates "statistical significance" to the pulpit of determining what is important. There is a huge literature regarding why this is a mistake, especially for observational studies and for studies that are not testing a single hypothesis. As Kenneth Rothman (former editor of "Epidemiology") so nicely put it "statistical significance confounds effect size and sample size." Instead of emphasizing statistical significance and hypothesis testing, the authors might have presented their effort as an attempt at effect estimation and used theory and the data to guide their interpretations. Instead they use a mindless mechanical statistical process based on assumptions unlikely to be true. Again, given the magnitude of many of the associations, my critique is unlikely to invalidate the authors' conclusions. I am simply pointing out that there are better alternatives to hypothesis testing and statistical significance for teasing interpretations out of these data. Although the calculation of difference measures and 95% CIs is based on virtually identical assumptions, these intervals would be better than "P<0.01" as a way reporting these results.
A nice example of how the hypothesis testing approach regrettably boxes the authors into a corner can be found in the final paragraph of the Results section. Here the author rely on statistical significance to identify important variables only to have to acknowledge that the failure to find additional variables may be due to low power rather than lack of association. A more straightforward approach would be to start with theory and examine estimates and CIs for the relevant variables.

3) Continuing along this line of reasoning, a bit more text regarding the underlying theoretical model that guided the regression model making would be helpful. What do the authors posit about the universe of variables that impact patient's glucose monitoring practices and how these variables relate to one another? Are the variables' relation to strip use completely independent? If not, should interaction terms be included in the model? Why use stepwise regression (with its multitude of problems (see Frank Harrell's works for an explication of these)) instead of theory to guide variable selection?

4) The authors do not mention in the limitations section that buying strips and using strips properly may be two completely different outcome (especially for the one-time strip buyers who may buy them but never use them). To the extent that any measure of strip purchase overestimates strip use, then the problem of getting diabetics to monitor their glucose is even worse than the dismal picture that this paper paints.

Overall, this paper makes a nice contribution to the health services literature regarding the care of diabetic patients.

**Competing interests:**

None declared.