Reviewer’s report

Title: Swiss chocolate and free beverages to increase the motivation for scientific work amongst residents – A prospective interventional study in a non-academic teaching hospital in Switzerland

Version: 0 Date: 04 Sep 2019

Reviewer: Siyun Yang

Reviewer's report:

Major comments

o Overall: thanks for submitting this manuscript; I commend your decision to put time into writing up and submitting 'smaller' pieces of work like this, i.e. those without funding. Publication of evidence like this enriches the literature. However, as detailed below, I feel there are currently significant issues with the methods (which could be fine if limitations are fully acknowledged), clarity of reporting and the validity of some claims made. I also think this needs to be made more broadly relevant outside of your local context, and better linked to existing research around recruitment in trials.

o Although I think there are not significant ethical concerns raised by this study, the general concept of incentivising clinicians to enrol patients into trials raises questions of conflicts of interest, and clinicians taking risks to obtain the rewards, not necessarily acting in patients' best interests. I think the paper should at least touch on this, if only to confirm that giving chocolate and drinks is probably not too concerning in this regard.

o More clarity is needed about the use of the vending machines in the randomisation process - see comments below. Could this work in multicentre studies and/or studies with complex randomisation methods?

o The study design and statistical methods are not adequate to make the claims currently made.

o The reporting of the results is difficult to follow. For example, some results are presented as comparisons between the two trials involved, some as comparisons between the timepoints of the two surveys (even though it is hard to interpret what this comparison means, because the soft drinks machine was already in use prior to the first survey timepoint). It would be useful to be consistent about how the results are reported. Other comments on this are below.

Minor comments

o Title: check with the journal, but I am not sure the sort of title in this manuscript is allowed in Trials, i.e. one that makes a claim ('...free beverages increase the motivation...'). In any case, as mentioned elsewhere, I think your grounds for making that claim are not strong.
Title: the wording of the title is not that clear, for example the meaning of the word 'instruction' and the lack of reference to any sort of study design.

Abstract: I have not fully reviewed this as I feel substantial change is required to the main body of the paper; I would like to review a revised version at the next round of reviews, please.

Background, line 2/3: '...effectively recruit as many eligible participants as possible...' - surely you want to reach a pre-defined sample size in efficient time, rather than recruiting as many as possible.

Background, line 4: can you back up your claim that recruitment processes 'can be influenced in various ways'? Or perhaps reword to make clearer what you mean?

Background, paragraph 2, line 1: 'participant recruitment is often conducted during first patient contact...' - suggest you supply a reference for this, or make clear that this is in your experience.

Background, para 2, line 2: you say recruitment is 'performed by a young resident'. Is it? How well does this fit with the principles of good clinical practice, where we'd expect all clinical staff to be fully trained and qualified? And can you guarantee a fair and adequate informed consent process if clinician is inexperienced? Is there any additional oversight of the informed consent process if 'young residents' are doing this? You don't have to amend the text to answer all these questions, but be aware that the reader may be surprised by this sentence.

Background, para 2, line 3: 'challenged by the imponderables...' - minor comment, but I'm not sure the tone of this is right here - I think it would be good to keep it factual if possible.

Background, para 2, line 3: 'Typically, this resident personally does not benefit, nor has any insight into the entire background of the trial.' Two problems with this: 1) I think clinicians do benefit, in various ways, such as in their career, personal interest in research, and sometimes in meeting recruitment targets the site has signed up to. 2) The comment about not having 'any insight' seems worrying, similar to the point above about inexperienced staff recruiting patients. How can informed consent be adequate if the clinician has 'no insight' into the background of the trial?

Background, para 2, line 5: 'Furthermore...' - this sentence about clinicians having diverse interests - can you back this claim up with evidence?

Background, para 2 final sentence: '...and thereby success...' - check this wording as it isn't right at present. I think the intention is for the verb 'influencing' to apply to 'the recruitment rate' and 'success' but this does not read very easily.

Background, para 3, first sentence: I do not believe you that there is no literature addressing motivation in trial recruitment. How much time have you spent looking? A relatively quick way to find evidence about recruitment is through the ORRCA database, if this helps. As per my major comment, above, I think this work in general would benefit from more clearly linking to
and building on existing evidence in this area (which is substantial, though not necessarily strong)

- Background, para 3, line 2-3: does reference 6 definitely show that 'motivation is not sufficiently triggered by providing information alone'? The parts of that work about information are about information for trial participants, though there are some sections about recruiter training.

- Background, p5 first line: perhaps more accurate to say you decided to try to increase motivation, rather than just deciding to do it? (Because it's not really in your control)

- Background, p5 same sentence: '...increase motivation to participate...' - I think you should make the whole sentence clearer that you mean motivation amongst recruiters, rather than participants. 'Motivation to participate' could certainly be read as referring to trial 'subjects'.

- Background, p5 line 2/3: 'Out hypothesis is...' - should it be 'was'?

- Background, p5 line 6: I don't think you can claim this study is 'unique'.

- Background, p5 line 7/8: 'reward based positive randomisation tool' - this is not a clear description, though I appreciate there is more detail in the methods. I think 'randomisation tool' is not a helpful term (as discussed elsewhere) if it is just the method of delivering the result of randomisation (as opposed to actually doing the randomisation). I'm also not sure what the word 'positive' means here.

- Materials and methods, line 4: 'we identified two positive influencing factors' - how did you identify these? Might it be more accurate to say that they were proposed as possible factors?

- Materials and methods, line 4: 'we identified two positive influencing factors as means to influence...' - check the wording regarding repetition of the word 'influence'

- Materials and methods, line 5/6: 'adequate information...was provided' - how do you know it was adequate? Maybe you just mean lots of information, or frequent information? And is it useful to add how the information was provided?

- Materials and methods, line 8: '...at a regular interval during recruitment...' - what interval, specifically? And suggest you clarify 'during recruitment' - I suspect this means during the recruitment period for the trial rather than during each patient's recruitment process

- Materials and methods, line 9: 'soft drink beverages' - this is tautological as 'drinks' and 'beverages' mean the same thing. Suggest just 'soft drinks' will do.

- Materials and methods, line 9: 'at the time of randomisation' - before or after? From later descriptions, I believe this was just after randomisation (as 'delivery' of the randomisation result)
M&M, section 3.1, line 1: I don't think the words 'Ethical Committee' need capital letters at the start.

M&M, section 3.1, line 2: suggest 'in the German Clinical Trials Register', not 'at'

M&M, section 3.1, line 4: recruitment took place in the emergency department; could you please clarify if these trials were in an emergency care setting? I presume not (based on later information), but emergency care might mean patients did not give informed consent due to temporary loss of capacity. This would make the potential conflict of interest involved in incentivising clinicians to enrol (mentioned in Major comments, above) more of an issue.

M&M, section 3.1, line 5: 'follow up controls' - not sure what this means - perhaps follow-up assessments?

M&M, section 3.1, line 6: should be 'patients were informed' (not 'where')

M&M, section 3.1, line 6: should be 'consented to', not 'in'

M&M, section 3.1, line 6: 'consented [to] further use of their data as for example a following survey' - I can't quite follow the meaning of this. If it isn't relevant to the rest of this paper, you could probably remove it. If it is relevant, please clarify the meaning.

M&M, section 3.1 Trial One, line 2/3: minor comment, but this reads as if the patient has no choice in the matter - they are apparently informed and then the resident completes the consent form. At what point do they get a choice about whether to participate?

M&M, section 3.1 Trial One, line 3: probably should be 'complete the informed consent form'

M&M, section 3.1 Trial One, line 5: here and elsewhere I think you should give more details about the randomisation method. You say the soft drinks machine is related to the randomisation process. What is the randomisation method, and does the drinks machine actually perform the randomisation, or just deliver the randomisation message, with randomisation performed by a computer program? If the machine does indeed do the randomisation, is that because you are only using simple randomisation in these trials? If so, is that methodologically justified in the trials' designs? And would use of the machine be useable in more complex randomisation processes?

M&M, section 3.1 Trial One, line 7: estimated additional work of 15 minutes - how did you calculate this? Can we be assured that it's a reliable estimate?

M&M: for both these trials, please also state the sample size, the number of centres involved and if any centre-specific recruitment targets. If both studies are single-centre, I think you could frame the whole paper in this context and consider in the discussion whether your approaches could be scaled up into multicentre studies.
o M&M for both the trials: were these trials having recruitment problems that needed resolving? Or were there similar trials previously that had struggled to recruit. This would be helpful context / would help understand your motivation.

o M&M Trial Two - the comments on the Trial One section also apply. Regarding the time estimate - given for this trial as 5 minutes additional work - this seems extremely small, and apparently includes the informed consent process. Is the patient given less than 5 minutes to agree to the study? Is this ethical?

o M&M, 3.2 line 1/2: 'A well-informed and motivated resident is...more likely to remember the existence of the trial'. I think I know what you mean, but this reads a little unclearly to me. Perhaps you mean they are more likely to remember to approach patients as part of their routine clinical work. Or is it a matter of remembering to prioritise one trial over another?

o M&M, page 8, line 2: 'being up to date in a specific area enables [the clinician] to inform the patient accurately, which increases the probability to convince the patient of the importance of an ongoing trial…' - does it? I think this is debateable. Unless you can provide convincing references for this claim, I would remove or adjust it.

o M&M 3.3, line 2: should be 'would increase mood'

o M&M 3.3, line 4: not sure about 'according', suggest 'using'

o M&M 3.3, Swiss chocolate, line 2: these claims about the benefits of chocolate are resting on one reference - is that perhaps a bit selective? I imagine there is a significant body of work on the effects of sugar on productivity. Did you find anything more comprehensive, for example a systematic review on this?

o M&M 3.3, Swiss chocolate, line 2: 'we chose the best chocolate, Swiss chocolate…' - Belgians may disagree! And I suggest you remove this as it is not the right tone (i.e. not objective). Did you ask your population what chocolate they might like, or just assume they would prefer your choice?

o M&M 3.3, Swiss chocolate: similar to the last point above, was anyone unwilling or unable to eat chocolate, because of personal preference or allergies or anything else? No information on this is presented.

o M&M p9, first line: 'Free soft drinks were identified…' - did you carry out any work beforehand to find out if staff wanted this?

o M&M p9, line 1-3: check the sentence structure - the second part ('we decided…') needs a better link to the first part, e.g. with 'therefore' or similar.

o M&M p9, line 3-5: as mentioned above, you should make clear whether the vending machine was just delivering the results of the randomisation performed elsewhere, or whether it
was actually performing the randomisation (in which case, there are various additional details we need about this - see above).

o M&M p9, line 5: I'm not sure 'purported' is the right word - it has the connotation of making a false claim. Suggest 'proposed'

o M&M p9, paragraph 2, line 6: 'pursing' - this probably isn't the right word, perhaps it should be 'pursuing'?

o M&M p9, paragraph 2, line 9: 'given the overwhelmingly positive response…' - this seems like a result, should it be in the results section?

o M&M Survey, p10: what software was used to carry out the survey?

o M&M Survey, p10: Figure 3 is referenced, but is not readable in the format I have it. Is it an image? Would it be better as a text-based format, e.g. Word?

o M&M Survey, p10, line 4: suggest a new sentence is started at the end of 'target population'.

o M&M Survey, p10, line 5: would you consider adding the cover letter as supplementary information so that readers can see how the survey was framed?

o M&M Survey, p10, line 5: check the wording of '..as well by a cover letter as in person'. Also, what did this in-person information consist of? Is there any risk that the in-person information biased the survey results?

o M&M Survey, p10, line 7: I think the survey was sent out at a point in time, not a period (though you were asking about a period - but that seems slightly different). This applies to the mention of the 'second period', further down the same paragraph.

o M&M Calculations, line 1: why were periods of 6 months chosen? This seems somewhat arbitrary, and for Trial 2 recruitment hadn't started for the first few months of period 1.

o M&M Calculations: recruitment rate needs to be more precise than just number of referred patients / number recruited. We would need to look at the reasons people did not take part - it could be that lots of people were ineligible for the trial, for example. I think your proposed intervention is supposed to increase clinician engagement and therefore increase the proportion of patients who are willing to join trials. Is there specific evidence that this happened in response to the clinician rewards?

o M&M Statistics, line 3: you say you calculated mean or median, but what outcome measures are these referring to?

o M&M Statistics: the text should make clear which parts of this were prospectively designed, or otherwise which were designed post hoc or as you went along.
M & M Statistics: you have said a two-sided p-value of <0.05 was considered as a threshold of statistical significance, but it isn't clear which primary question you would apply this to. If you are applying this to many tests then it becomes meaningless.

M & M Statistics: you say you have no missing data (which is probably a result not a method), but then at the start of Results you say not all invited participants took part in the survey - this is missing data. What if the views of the non-respondents - which you did not capture - are significantly different to those of respondents?

Results, line 1: why is there a different denominator in round 1 and 2 of the survey? Were they different people? If so, how can we make any comparisons between the rounds of the survey?

Results, line 2 and generally: a p-value is given but it isn't clear what this is supposed to mean. In general, suggest you are more sparing with p-values as the experiment does not seem set up to produce robust tests of statistical significance. Any values given are likely to be explorative only.

Results, line 4: numbers are given for interest in clinical scientific work, but it isn't explained what the scale is.

Results, line 5: 'All participants indicated…' how did they indicate this? Is there a survey result to give here? Was the question that found this result a leading question (e.g. 'do you agree that…')?

Results, paragraph 2, line 2: what is the value of asking a preference between the trials? Similar interventions were implemented in both trials, so it's hard to draw a meaningful conclusion from the difference. The results seem to show that more people had a preference either way at the time of the second survey, but it's hard to know what this means.

Results, paragraph 2, from 'The most common reasons…': I suggest reworking all of this, as for me it is difficult to interpret what it all means; is the comparison between the two survey timepoints very meaningful? Were these aspects ones you asked about specifically (and if so, why these?) or ones people raised spontaneously in response to open-ended questions? As above, there is a problem with varying denominators (18, 22, 32).

Results, paragraph 3, line 1: what does 'maximally motivated' mean? How did you measure whether people were maximally motivated? Or is this just subjective reports from individuals? If so, is this reliable? How does this contrast with 'gradable motivation' in the same paragraph? And how have you defined and measured that?

Results, paragraph 3, line 4: suggest you don't need the word 'respectfully'

Results, paragraph 3, line 3-5: is it useful to know this comparison between timepoints in terms of staff asking for more information? What can we learn from this?

Results, p13, line 1: '…motivation would be increased if … work load was smaller'. Isn't this completely obvious? More gain for less time commitment? Why might we expect people's motivation to not increase if they had to commit less?
o Results, p13, line 2: you say the workload remained stable, but how did you measure this? And are your measurements reliable?

o Results, p13, line 4: this is a confusing sentence - it might be resolved by changing 'including' to 'included', if this is the intended meaning?

o Results, final paragraph: as mentioned above, the recruitment figures need more thought. You say there was no difference to report before/after use of the soft drinks machine, but I suspect if there was a difference in numbers it would be difficult to attribute it directly to your soft drinks machine - this is not a randomised experiment, and recruitment might vary for other reasons. So it follows that I don't think you have demonstrated that your intervention does NOT work, either. Suggest re-wording to reflect these limitations.

o Discussion, line 1: all residents being completely familiar with the study - I don't quite follow how this conclusion is reached from the Results presented. How do you define and measure 'completely familiar'? Is this an important conclusion for the wider trials community?

o Discussion, paragraph 2: point made again about people saying they would have greater motivation if workload were smaller - is this so obvious that it is not worth reporting?

o Discussion, paragraph 2: point made again about workload remaining stable - as above, what is the proof of this? You then immediately suggest that the inclusion process was less time-consuming - therefore less work, surely?

o Discussion, paragraph 3, line 1: what should the reader learn from knowing that people preferred trial 2? Is this an important finding for the wider trials community?

o Discussion, paragraph 3: I think the statistics given (5, 15; 33%, 44%) are for trial two THEN trial one, which is counterintuitive. Make it clear by saying which trial each statistic refers to.

o Discussion, paragraph 3, line 7: as previously, make clear if this was randomisation result delivery method, or actual randomisation method.

o Discussion, paragraph 3, line 7: 'we managed to raise [preference for trial one] to 17%' based on the soft drinks machine - but that was also used in trial two?

o Discussion, paragraph 3, line 8: suggest neater to remove the words 'fact of a'

o Discussion, p15, line 3: suggest comma after 'interestingly'

o Discussion, p15, line 7: 'this is one of the important lessons learned from this study…' - I don't think the evidence you have provided allows you to make this fairly strong claim (although I accept the claim itself is not unreasonable). Suggest re-wording to reflect this limitation.
Discussion, p15, lines 10-14: similarly, you say your studies are on time with recruitment, but I don't think you can make a strong claim that it is a result of your soft drinks and chocolate interventions. This is what seems to be implied here.

Discussion, p15, line 15: on what basis do you say your recruitment rates are 'quite high'? Can you provide something to compare these rates to, in a similar setting?

Discussion, p15, lines 15-18: Again, I don't think the evidence provided supports your claim that 'stable and high recruitment rates are partly due to...[your interventions]'

Discussion, p15, line 23: 'the basic scientific interest seems quite high for a non-academic teaching hospital' - what are you basing this on? Do you have other data to compare this to?

Discussions: limitation to add - this is not a randomised study, and therefore your ability to claim that your interventions caused your outcomes is limited

Discussions: limitation to add - currently it is hard to see how the results are generalisable or relevant outside this very local setting - but you might be able to say more on this.

Conclusion: I'm not sure you can claim this study is 'unique', nor that 'no study has focussed on these positive motivation methods' - I am sure that there is a body of literature about use of incentives to enhance trial recruitment. Have you searched for it?

Conclusion: sentence beginning 'The results of our survey...' makes claims that I don't think are supported by this work, namely that the interventions in this study have caused a high recruitment rate and motivation of residents for scientific work. As discussed elsewhere, I do not feel the study design allows this inference to be made, so I suggest this conclusion is toned down appropriately.

References: number 2 in the list is missing the year of publication.

Table 1: 'In- and exclusion criteria' - I don't think this is a correct way to write this; suggest simplify to 'eligibility criteria'

Table 1: check spelling 'departent'

Figure 4: I find this figure confusing, and it's hard to see what message it is aiming to convey. I wonder if a neater way to display this would be to have two columns -first round and second round - each of which includes 3 bars within it, for Prefer trial 1, No preference, Prefer trial 2 (as these should add up to 100%). You would then be able to see more clearly the difference between first and second round, if this is your aim. The main thing I see here is that more people had a preference either way in round 2, but I'm not sure how I should interpret this (as mentioned elsewhere).

Figure 5: as mentioned elsewhere, I do not understand this terminology of 'maximal' or 'gradable' motivation, and I'm not sure if it is a reliable measure, between or within survey
respondents. I also wonder whether the suggestion above for Figure 4 (to present in two columns, round 1 and round 2) would make the Figure clearer to read - that's assuming the three categories should add up to 100% in each round?

o Figure 5: title says 'Is the motivation to include patients gradable?' - I have mentioned elsewhere that this paper seems to omit mentions of patients having a choice in the matter, and this is another case. Should it say instead something about considering patients for the trial, or offering patients the chance to join?

o Figure 6: I think the labelling needs improving - I'm not sure about this device of having ellipses after the X-axis data labels linking to the main axis label.

o Figure 6: is it true to say that the options 'gratification' and 'information' were concrete/real, whereas the 'less work' option is hypothetical? Does this affect how meaningful this comparison is?

o Figure 6: as for other Figures, if the 3 options add up to 100% each time these could be combined into single columns.

o Figure 6: as I was unable to read Figure 3, I'm not sure what questions were asked. Were only these 3 options offered to people, or are these things that people mentioned in response to open-ended questions? If so, did people really not mention altruism or clinical interests or publications or their career or anything else? If it was a pre-selected list, how do you justify choosing only these?

o Figure 6: what do we learn from the comparison between round 1 and 2 in this case?

Level of interest
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