Reviewer's report

Title: Evaluating integrated headache care: A one-year follow-up observational study in patients treated at the Essen headache centre

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Reviewer: Christoph Schankin

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In the manuscript „Evaluating integrated headache care: A one-year follow-up observational study in patients treated at the Essen headache centre“ Dr. Gaul et al. present their experience with out-patient integrated headache care. They prospectively asked 1871 patients to take part in the study. 841 of those (45%) could be interviewed at 3, 6 and 12 months. Favorite outcome was defined as a reduction of headache days by 50% and was found in 306 patients (36% of 841). It was associated with age and headache frequency at baseline. Headache days were reduced in 486 (58%) of patients. Improvement from chronic headaches to episodic was found in 486 (58%) of patients. Improvement from chronic headaches to episodic was found in 21% whereas only 25 patients (3%) worsened from episodic to chronic. Medication overuse was successfully reduced in 50/59 patients.

Overall, this study demonstrates important findings that support the treatment of headache patients in an integrated care setting. The authors already mention the low return rate in the discussion. It is very difficult to keep track of so many patients, so this is acceptable. The prospective design and the long follow-up are the actual strength of the manuscript. Further, they show nicely that the usually difficult to treat patients with chronic TTH, high number of headache days per month and even MOH profit significantly from the multidisciplinary treatment program. It is a good approach to use logistic regression in the high number of patients included in the prospective study.

However, a few points need to be addressed.

Major problems:
1) A substantial proportion of patients worsened after treatment. This should also be mentioned in the discussion and the abstract.
2) P6/first line: Risk factors for chronification are mentioned in the method’s section. The respective data in the results and discussion are missing. This is an important question. So the risk factors for headache chronification should be added.
3) Table 1:
   a. It is neither clear from the text (methods, results) nor from the legend, which statistics were performed to obtain the p-values that were listed in the table. Which was the dependent, which were the independent variables?
   b. Some parameters (e.g. “low education”) add up to 100% in the total column,
others (e.g. “male”) do not. Please be consistent. A similar problem is found for some total row (e.g. “marital status”).
c. Similarly: The Total/Total field adds up only once (“Gender”) to 841. This is a prospective study – so all data should be obtained prospectively. And only complete data sets were used according to p6/patients characteristics. Please correct or comment.

4) Outcome (p9)
a. “There is no significant difference between the headache groups (migraine…”). From the text, it is unclear which outcome measure was used for the statistics.
b. Similarly, the sentence “Regarding demographical characteristics…” is difficult to understand – what was the hypothesis behind the statistics?

5) Table 2:
a. The statistics show that a favorable outcome is associated with higher numbers of headache days (high OR). The same (high OR) was found for age > 40 years – so the interpretation that lower age is associated with a better outcome is wrong (it is the Reference, i.e. OR = 1, and has a lower chance of favorable outcome). This should also be corrected in the discussion (p12) and the conclusion (p14).

Minor problems:
1) Abstract/methods and p4/last line: the authors differentiate between medication overuse and medication overuse headache (MOH). MOH is defined by the IHS. Please give the definition for medication overuse without headache that was used for this study.
2) Abstract/results: mean reduction is given with SD – please add also SD for baseline mean headache frequency.
3) P4/methods: “Inclusion criterion was TTH (mostly chronic TTH).” Please state whether TTH or chronic TTH was inclusion criterion. If all patients with TTH were included, but most had chronic TTH – then chronic TTH is result and not method.
4) P5/baseline: Please add a reference for validation of the questionnaire.
5) P6/statistics: Why was age 40 used to differentiate between old and young?
6) P12: “Our multi-variate analysis revealed… for the youngest patients (16-25)...age cohort 46-55. This refers to Table 2 – however, the data is not presented in the results. This should be corrected (maybe age 40 was meant, see comment above?). Similarly, for data cannot be found that would support “Patients with migraine and migraine and TTH ...(> 25 headache days...”.
7) P13: “However, 53 of 59 patients...who were diagnosed with MOH...”. Also here, the data is missing in the results.
8) The text should be carefully checked for spelling and wording errors (e.g. p2/conclusion: „offer”, p3/middle: „surggeons“, p4/methods: „ICDH-II”, p4/setting: “referred”, p5/baseline: “recoreded”, p7/first line: “migriane”, p9/outcome: “there is no significant” – the time should be past as for the rest of the results, p13/second half: “focusimg”, p14/middle: “A formal socioeconomic analysis was not part of
the present study will be the focus…”).

**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I declare that I have no competing interests.