Author's response to reviews

Title: Nurse telephone triage in out-of-hours GP practice: determinants of independent advice and return consultation

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Author's response to reviews: see over
Dear Dr. Pemberton,

Thank you for sending us the comments by the three reviewers. Based on all their suggestions and critical remarks we have revised the article on important aspects. In this accompanying reply, we will try to address all critical comments with reference to the changes in the text where appropriate. Please note that the relative risks in Table 2 are adjusted due to small changes in the syntax of our analysis. This also resulted in a slightly more parsimonious model, yielding no association with nurses’ prior experience in a GP surgery (y/n). Compared to our previous submission, however, the key messages have remained unaltered.

We thank all reviewers for their supportive reactions and useful remarks.

We look forward to receiving your reply.

On behalf of my co-authors,
Yours sincerely,

Eric P. Moll van Charante
General Practitioner
Reviewer: Alicia O’Cathain

General
I think this a good addition to knowledge.
I like Figure 1 because there is a lot going on here and I only really got to grips with it when I saw this diagram. Figure 2 is useful too.

Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached).

1a. There are only 8 nurses in this study and this makes it extremely difficult to identify statistically significant differences between nurses with different characteristics. You say this in the discussion but it needs to be addressed more seriously. Having ‘clinical experience was not independently associated with NTC rates’ in the abstract needs to be removed because this may be due to a lack of power. These are multilevel data. This implies that nurse-level variables may borrow statistical precision from patient-level observations. Although the number of nurses is, admittedly, limited, the number of patients per nurse varied between 115 and 412 (median is 188). Given an intra-class correlation of around 3.3%, statistical theory has it that reasonable precision of nurse-level factors may be obtained. This is supported by the finding that the confidence intervals for the four nurse-level factors (determinants) were not extremely wide. In the univariable analysis, the estimates for the nurse-level determinants were (relative risks and 95% confidence limits): sex 1.03 (0.73 to 1.38); experience of at least 20 years 1.02 (0.79 to 1.29); experience in at least 3 medical specialties 0.97 (0.73 to 1.25); experience in GP practice 0.98 (0.70 to 1.32). In the multivariable model, none of these variables showed a significant association with the dependent variable.
All in all, we decided to keep the nurse-related variables in the description of the initial set of determinants, although we have left them out of the abstract. Furthermore, to acknowledge that the low number of eight nurses is a limitation of our study, we added this to the limitations section of the discussion (p10, lines 19-21).
Also, we added the following sentences (p11, lines 7-13):
Finally, in this study the small number of nurses allowed the inclusion of only a few nurse-related characteristics, such as length of clinical experience (both in and outside GP practice), or variety of experience 1. Nevertheless, in addition to being important in explaining differences in clinical behaviour between nurses (as illustrated by NTAA), these or similar variables may also be amenable to modification through continuing education. Further research including larger numbers of nurses is needed to explore the effect of nurse-related features on the provision of telephone advice.


1b. When I looked at Table 2 to check the odds ratio for this variable the non-significant variables were not shown – they need to be.
We used standard statistical modelling procedures according to D.G. Kleinbaum in which a larger model is made as parsimonious as possible based on two principles: (1) avoid confounding by not accepting large changes in the regression coefficients of the variables retained in the model; and (2) use the likelihood ratio test to see whether a more parsimonious model fits the data significantly worse than a larger model. We could imagine a table that would show the univariable – that is, unadjusted relative risks for all variables we entered into the initial model, along with the remaining (most parsimonious) model. To that end, we have changed Table 2 to the current one (p21).
2. When I read the abstract I did not really know what “independent nurse telephone consultations” meant. You refer to it as ‘handled by a nurse alone’ in other parts of the paper and I like this. It also confused me when I read the background section of the paper because you seem to use the NTC abbreviation to refer to nurse consultation in general where nurses may handle calls themselves and also refer calls on to a doctor or other service, and to indicate where they handle calls alone. It is worth being really clear about this in the abstract and background.

We welcome these suggestions and have substituted NTC (‘nurse telephone consultation’) for NTAA (‘nurse telephone advice alone’) in the current version.

3. 4902 calls were registered. How many calls were made in this time period?

A thorough analysis of all telephone contacts that were entered in the electronic medical records between 1 November 2002 and 1 March 2003 yielded 5007 contacts. This means that we missed 105 (=2.1%) of the contacts with our registration. Many of these contacts (61/105 = 58%) concerned repeat prescriptions, while the remaining 44 contacts concerned various problems (23 first presentations; 17 of these were problems belonging to the top 10 that was studied). Overall, the impact of the missing contacts is therefore likely to be very limited.

(See also under 5.)

We added an extra sentence on the reliability of the data collection in the discussion paragraph (p10, lines 27-30):
Compared to the EMR, there appeared to be a general underestimation of the prospectively registered contacts of 2.1% (data not shown; mainly contacts concerning repeat prescriptions), indicating that the overall reliability of the first contact data is satisfactory.

4. You state that numbers were too low to allow for case-mix adjustment when looking at return consultations. Can you explain what was going on here?

We wanted to find out whether there were differences between the nurses with regard to the proportion of return consultations to the GP following NTAA. However, out of the 390 patients who received NTAA, only 132 (33%) were found to have a return consultation with their GP surgery. These 132 patients are divided across 8 x 10 cells (8 nurses x 10 types of problems). In particular, the cells on ‘chest pain’ and ‘localized abdominal pain’ contained 0 and 6 return consultations, respectively, which made incorporation of these potential confounders impossible. Therefore, unfortunately, it was not possible to tell whether the return consultation rates from the eight individual nurses (ranging from 23 to 44 percent) showed significant variability or not, as was shown for the initial NTAA.

We added to the text (p9; lines 11-14):
Since the number of 132 (out of 390) patients returning after NTAA was too low to allow complete adjustment for case-mix differences (being divided across 8 (nurses) times 10 (types of problems)), no variability could be detected between the nurses with regard to the proportions of return consultations.
5. If follow-up data were collected two years later then surely this must have affected the quality – can you say what effect you think this had on quality?

There are two reasons why we think that the reliability of the first contact registration is satisfactory (see also under 3.). First, there were financial incentives for the GP practices to claim all (return) contacts with the surgery. Second, all 26 participating GPs in the region had worked with EMR for over a decade. Nevertheless, it is true that we do not know exactly how reliable the EMR is with regard to the return consultations. Therefore, we added the following sentence to the discussion section (p10, lines 30-33):

However, GPs or practice nurses may not always have entered information in the EMR when patients re-contacted their surgery in the daytime, although we believe that the financial incentive to claim all surgery contacts will have limited the number of missing data.

6. The conclusion of the abstract could be clearer.

We have tried to improve the clarity of the conclusion in the abstract, changing the text to the following (p3, lines 20-22):

Important inter-nurse variability may indicate differences in perception on tasks and/or differences in skill to handle telephone calls alone. Future research should focus more on modifiable determinants of NTAA rates.

7. I wonder if the fact that 45% of calls were handled by the nurse alone at nighttime should be discussed more. There were fewer doctors available in the service at night and nurses may have said informally ‘come back tomorrow to see a doctor’. This could affect the interpretation of all the findings.

Within the setting of this small GP cooperative, there was only one doctor available from 11 pm onwards to answer complex calls, examine patients in the GP centre, or make home visits. From my own observation (and experience), during the nightly hours GPs tend to either provide patient care or try to get some sleep, while the nurse remains awake during all hours of her shift. Therefore, the threshold may become higher for her to consult a GP when talking to patients who contact the cooperative. Perhaps the assumption that nightly calls are of a more serious nature is supported by a significantly higher hospital referral rate during these hours compared to the day and evening (this was added to the results). At the same time, nurses may have received explicit instructions to triage more strictly, thus referring more patients back to their own GP than they might have done during the day or evening (‘come back tomorrow’). Although the latter mechanism was not supported by the text on the nurses’ telephone advice in our data, we do not know whether they are sufficiently reliable to study this aspect of the triage.

We have added the following text to the discussion (p11, line 29 to p12, line 3):

We found that nurses handled a larger proportion of calls alone at night than during the day and evening. While after midnight calls are thought to be of a more serious nature, as is perhaps supported by our finding that more patients were referred to the hospital during the night than during the day and evening, we would have expected the NTAA rate to go down during the night. At least two mechanisms may, in combination, be responsible for this finding: explicit instruction to triage more strictly or implicit perception of a higher threshold to consult the GP who may have been asleep or out on a visit. More research is needed to answer the question whether nurses take on more complex cases during nightly calls and to study to what extent this affects the quality and safety of care.

8. Table 2. Please add all the variables you talk about in the results.

We have addressed this issue under 1b.
Reviewer: Brian McKinstry

General
Thank you for asking me to review this interesting article which compares the types of problems managed by doctors and nurses working out-of-hours in a small call centre in the Netherlands. The paper is generally well written and easy to follow.

1. The authors do make several assumptions in their interpretation of the results that, while likely to be true, are perhaps not justified from the evidence they present. For example the assumption that a high onward referral rate by doctors to hospitals reflects the seriousness of the cases that were seen. While I agree this is likely it should be made clear that alternative explanations (e.g. GPs more cautious than nurses) are also possible.

Although we had not considered this possibility, we agree that the differences found may in part have resulted from a more cautious attitude by GPs when patients revisit their surgery after a contact with a fellow GP during out-of-hours. We therefore added the following text to the discussion (p11, lines 1-6):

In this study, no quantification could be given for differences in severity of illness within the types of studied problems, leaving some room for residual confounding. Furthermore, the higher onward hospital referral rate after GP contacts compared to NTAA may indicate a higher level of complexity, but this association is perhaps confounded by the GPs’ cautiousness and higher propensity to refer patients to the hospital who revisit their surgery after an out-of-hours contact with a fellow GP.

2a. This is quite a small study, with only 8 nurses who varied greatly in their management and perhaps more should be made of the possibility that these results may not be generalisable.

The discussion was revised to read as follows (p10, lines 16-21):
However, we need to bear in mind that the cooperative studied was somewhat different from most others as it was located in a former A&E Department rather than a primary care centre and had employed former A&E nurses rather than practice nurses. Moreover, since the number of nurses who participated in this study was rather small, the results may not be generalisable to other GP cooperatives.

2b. Several correlations (e.g. with age and experience) had little hope of being significant given these numbers and I am surprised they looked for them.

One of the main incentives for including nurse-related variables in the regression analysis was our awareness of their substantial potential impact on inter-nurse variability. Moreover, these variables may be more amenable to change (through continuing education) than patient-related variables.

Although the number of nurses in our study is, admittedly, limited, the number of patients per nurse varied between 115 and 412 (median is 188). Within a multilevel analysis, nurse-level variables may borrow statistical precision from patient-level observations. Given an intra-class correlation of around 3.3%, statistical theory has it that reasonable precision of nurse-level factors may be obtained. This is supported by the finding that the confidence intervals for the four nurse-level factors (determinants) were not extremely wide. Therefore, we decided to keep the few nurse-related variables in the initial model, although in the
discussion paragraph we admit that indeed caution should be taken in generalising the data (as stated before). Finally, we have left the nurse-related determinants out of the abstract.

3. I would have been interested in some explanation as to why nurses handled a bigger proportion of calls at night than by day. Was this down to different nursing staff who doing nights than by day or a relative scarcity of doctors? My own work(1), admittedly conducted several years ago in the UK, suggested that while there are fewer calls after midnight they tend to be more serious. If anything I would have expected the proportion of calls overnight handled by nurses to go down if the authors’ hypothesis that nurses hand over the more serious and complex conditions is true. I would value some further discussion of this point.

Within the setting of this small GP cooperative, there was only one doctor available from 11 pm onwards to answer complex calls, examine patients in the GP centre, or make home visits. From my own observation (and experience), during the nightly hours GPs tend to either provide patient care or try to get some sleep, while the nurse remains awake during all hours of her shift. Therefore, the threshold may become higher for her to consult a GP when talking to patients who contact the cooperative. Perhaps the assumption that nightly calls are of a more serious nature is supported by a significantly higher number of hospital referrals during these hours compared to the day or evening (this was added to the results). At the same time, nurses may have received explicit instructions to triage more strictly, thus referring more patients back to their own GP than they might have done during the day or evening (‘come back tomorrow’). Although the latter mechanism was not supported by the text on the nurses’ telephone advice in our data, we do not know whether they are sufficiently reliable to study this aspect of the triage.

We have added the following text to the discussion (p11, line 29 to p12, line 3):
We found that nurses handled a larger proportion of calls alone at night than during the day and evening. While after midnight calls are thought to be of a more serious nature (1), as is perhaps supported by our finding that more patients were referred to the hospital during the night than during the day and evening, we would have expected the NTAA rate to go down during the night. At least two mechanisms may, in combination, be responsible for this finding: explicit instruction to triage more strictly or implicit perception of a higher threshold to consult the GP who may have been asleep or out on a visit. More research is needed to answer the question whether nurses take on more complex cases during nightly calls and to study to what extent this affects the quality and safety of care.

Other weaknesses in the method have been accounted for in the discussion, which is comprehensive.

Reviewer: Geertjan Wesseling

General
In this well-written paper an analysis is presented of nurse telephone consultations on the ten most frequently presented medical problems during out-of-hours GP practice in one out-of-hours GP cooperative in the Netherlands. As could be expected, a substantial number of cases (27.5%) presented through telephone contacts were dealt with by the nurse, only to be authorised afterwards by the GP on call. More complex cases including chest pain, shortness of breath and localized abdominal pain and older patients were referred to the GP. No associations between nurse telephone consultations only and sex or type of insurance of the patient, distance to the GP cooperative or background or experience of the 8 nurses in this cooperative were found. More patients reported to their own GP later having been dealt with by the nurse only (33.8%) than after a contact with the GP (26.9%), but considering the fact that the GP saw more complex cases and older patients, one could have expected the reverse to be the case.

1. In my review there is no substantial inter-nurse variability. The remark in the conclusion section in the abstract suggests otherwise.

We have revised the text where appropriate. The point that we wanted to make was that inter-nurse variability remained significant after controlling for the determinants in the most parsimonious model. Since the interpretation of an ICC may be more complex than that of Figure 2, we decided only to mention a p<0.001 value in the text, rather than a percentage.

2. The sentence: During the study period, the telephone triage was performed by one of eight nurses who ... in the methods/setting section is confusing. All eight nurses participated but always only one at a time.

We have tried to clarify this by rephrasing the text at this point (p6, lines 7-11):
'The GP cooperative operates from 5 pm until 8 am from Monday to Friday and 24 hours during the weekends. Apart from 11 pm to 8 am when only one GP is on call, two GPs work alongside, one making home visits and one taking care of centre consultations and telephone calls. They are supported by one nurse, who performs the telephone triage as described before.'

3. Figure 1 is not easily understood. Do we need the 3 research questions to be depicted in this way? The 3 types of GP consultations (telephone, centre consultation and home visit) are best mentioned in the text and omitted from the figure.

We have followed this advice: the question-indicators (Q1 through Q3) have been removed and the types of GP contacts have been described in the text.

4. The second part of the legend to figure 2 is best omitted, only to be represented in the text.

This suggestion has also been followed.