A randomized controlled trial of nurses vs. doctors in the resolution of acute disease of low complexity in primary care

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Accepted for publication 2 February 2013

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Abstract

Aims. To compare the effectiveness of care delivered by nurses to the usual care delivered by general practitioners, in adult patients requesting same day appointments in primary care practices in Catalonia (Spain).

Background. Same day appointments conducted by nurses are characterized by high patient satisfaction and a high resolution index. The profile of nursing and the organization of primary care services in our country differ from other countries.

Design. Multicentre, randomized, unblinded clinical trial with two parallel groups.

Methods. Patients were randomized to an intervention group (seen by nurses trained to respond to low complexity problems) or a control group (seen by the general practitioner) using an automatic probabilistic function. Setting: 38 primary care practices in Catalonia, 142 general practitioners and 155 nurses participated. Population study: >18-year-old patients who requested a same day consultation. Recruitment period: January–May, 2009. Of the 1,461 randomized patients, 92.5% completed the study. Main outcome measures: resolution of symptoms and patient satisfaction 2 weeks after the visit.

Results. Seven hundred and fifty-three patients were assigned to the intervention group and 708 to the control group. Nurses successfully solved 86.3% of the cases. We did not observe any differences in resolution of symptoms or patient satisfaction between the groups.

Conclusions. Nurses trained specifically to resolve acute health problems of low complexity give comparable quality of care to that provided by general practitioners in terms of resolution of the problem 15 days after the visit and in patient satisfaction with the visit.

Keywords: low complexity problems, nurses, patient satisfaction, primary care, resolution, same day consultation

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Introduction

High demand for general practitioner’s (GP) appointments is one of the most worrying problems for Spanish healthcare professionals. Resulting time constrains compromise GP’s problem-solving capacity and result in increased secondary care referral rates (Iliffe 2000, Bell et al. 2004, Casajuana 2005). This type of demand represents a significant part of the GP’s daily activity, despite the fact that it tends to include less complex, self-limited acute pathology which generally requires no specific medical care (Imperial Cancer Research Fund OXCHECK Study Group 1995, Campbell et al. 1998, Delaney et al. 2008) in periodic check-ups of chronic diseases (Lenz et al. 2004) and in the resolution of same-day consultations (Kinnersley et al. 2000, Shum et al. 2000, Vennig et al. 2000, Bellón 2004). Although the task of following-up chronic diseases has been given to nurses in our country’s primary care practices, it is the GP who traditionally sees most of the patients requesting same day appointments (Bellón 2004, Casajuana 2005). This type of demand represents a significant part of the GP’s daily activity, despite the fact that it tends to include less complex, self-limited acute pathology which generally requires no specific medical care (Richardson & Maynard 1995, Kinnersley et al. 2000, Shum et al. 2000, Horrocks et al. 2002, Giesen et al. 2007). The percentage of patients requesting this type of visit oscillates between 10% and 25% in Spain (Bellón 2004, Collada et al. 2004, Pedrera et al. 2004). Some articles indicate that the main reasons for same day appointment’s requests are bureaucratic in nature or represent problems that could be seen another day. The profile of users demanding these type of visits are young people between the ages of 20–30 who prioritize rapid care, independently of the professional attending them (Kinnersley et al. 2000, Shum et al. 2000, Rodriguez et al. 2001). It is estimated that 75% of the population...
uses urgent care services, even when the illness does not require it. These kinds of consultations consume 50% of a GP’s time (Diaz-Berenguer et al. 2002).

Nurses are able to solve independently up to 85% of the consultations (Marsh & Dawes 1995, Bonsall & Cheater 2008). The latest review in 2009 (Keleher et al. 2009) corroborates the results of previous reviews (Laurent et al. 2004) which affirm that visits conducted by nurses are characterized by high patient satisfaction and a high resolution index. Generally, nurses consultation’s take longer than GPs, however, they give patients more information and they achieve higher patient adherence to treatments. About the resolution of health problems, morbidity, mortality, health status perception and drug prescriptions, the results are equal between professionals. Studies also reveal that GPs and nurses request a very similar amount of diagnostic and complementary tests and follow-up visits.

There are few studies that have evaluated this matter in Spain (Isanta et al. 2000, Collada et al. 2004, González et al. 2004, Pedrera et al. 2004, Brugues et al. 2008); furthermore, the profile of nursing and the organization of primary care services in our country differ from other countries. The most important differences are the restrictive legislations in prescription, the introducing a new role of nurses in practice and population resistance to be attended by nurses (Fabrellas et al. 2011). Even though service providers are currently undertaking steps to expand the role of nurses in the resolution of health problems, especially during periods of increased demand such as the influenza epidemic, it is necessary to conduct studies evaluating this kind of intervention in our country.

The study

Aims

The aim of the study was to compare the effectiveness of care delivered by nurses to the usual care delivered by GPs, in adult patients asking to be seen on the same day in primary care practices belonging to the Institut Català de la Salut (ICS) in Catalonia (Spain).

Methodology

Design

A randomized, unblinded clinical trial with two parallel groups. Patients were randomized to an intervention group (seen by nurses trained to respond to low complexity, acute pathologies), or a control group (seen by the GP).

Participants

Eligible participants were patients who went to any of the participating centres and asked to be seen on the same day. The inclusion criteria were: (i) to be 18 years old or more; (ii) to have an assigned GP or nurse in the centre; and (iii) to present with one of the problems included in the study (burns, injuries, acute diarrhoea, non-specific low back pain, acute mild upper respiratory symptoms (including odynophagia) and urinary discomfort). Patients with the following characteristics were excluded: (i) needle drug users; (ii) presence of a serious health condition; (iii) receiving oral anticoagulant treatment, lithium or monoamine oxidase inhibitors; (iv) history of serious disease; (v) pregnant or breast feeding, (vi) hospitalization in the previous 15 days; (vii) foreseeable difficulties in completing the intervention or follow-up; (viii) home visit; (ix) telephone visit; (x) previously included in the study; and (xi) previously seen for the same episode.

Study settings

In the study 142 primary care practices belonging to the Institut Català de la Salut (ICS) were invited to participate. The ICS is the main primary care service provider in Catalonia (Spain), giving coverage to approximately 80% of the total population (7,475,420 inhabitants in 2009). To participate in the study, each practice had to include at least one GP, one nurse and one administrative staff member.

Interventions

All patients requesting a same day appointment were referred to a healthcare professional who checked the inclusion and exclusion criteria, explained the nature of the study and asked for consent to participate in the study. Once oral and written consent were obtained, the patient was randomly assigned to either the control or intervention groups.

Patients assigned to the intervention group were seen by trained nurses who followed the guideline developed during the study’s preparation phase. The nurses had access to an electronic application which included the guideline, designed as a decision-making support tool. Patients assigned to the control group were seen by the GP, who followed the usual procedures established in the practice and did not have access to any kind of decision-making support tools.

Sample size

The sample size was calculated to determine bioequivalence between two proportions. A sample of 1,064 patients was obtained based on the following assumptions: a 65% resolution of symptoms at the two-weeks follow-up, relevant differences as \( \geq 10\% \), a bilateral contrast of hypothe-
sis, an α value of 0.05, a β value of 0.10 and 10% loss to follow-up. To isolate the effect of the intervention and to eliminate differences due to variability between professionals, a minimum of 40 professionals (20 nurses and 20 GPs) and 20 primary care practices were required to participate. Due to the presence of intraclass correlation in patients seen by the same professional, the sample size was adjusted by an inflation factor of 2.024, obtaining a final sample size of 2,154 patients (1,077 per group).

Since participation was higher than expected, the intraclass correlation inflation factor was recalculated as 1.121, taking into account the actual number of participating professionals (142 GPs and 155 nurses). The percentage of loss to follow-up was increased to 20%, as this figure was considered to be more suited to the reality of the clinical trial. The rest of the applied assumptions in the initial calculation were maintained, obtaining a final sample size of 1,340 patients (670 per group).

**Randomization – sequence generation**
Participants were randomly assigned following simple randomization procedures to intervention or control using an automatic probabilistic function which assigns one group or another using a probability of 0.5. Patients were recruited consecutively until the necessary number of subjects was obtained, ensuring a balanced allocation of groups.

**Randomization – allocation concealment:**
The application was used to implement the random allocation sequence. The sequence was concealed until groups were assigned because the application generated the sequence just after the patient gave oral and written consent to participate in the study.

**Randomization – implementation**
Once the application assigned the group, the healthcare professional said the group assigned to the patient.

**Blinding (masking)**
Participants, nurses and GPs where not blinded to group assignment. The administrative staff member, who phoned the patients 15 days later to the first visit, where blinded to group assignment.

**Data collection**
The consultation and follow-up variables were collected in an application specifically designed for the study. The main variables were collected using a telephone interview 15 days after the visit.

**Outcomes**
To measure the effectiveness of the intervention, the following primary outcome measures were collected: resolution of symptoms (yes/no) and patient satisfaction (scale from 0–10) 2 weeks after the visit (Catalan Ministry of Health & Catalan Health Service 2012).

The secondary outcome measures were: Resolution by nurse (1 = resolution without the intervention of the GP, 2 = resolution after consulting with the GP, 3 = resolution after referring to the GP by protocol indication, 4 = non-resolution and referral to the GP. Categories 1–3 were considered satisfactory resolution by the nurse and category 4 was considered non-resolution); re-visit in primary care for the same reason during the following 2 weeks (yes/no); admission to hospital for the same reason during the following 2 weeks (yes/no); duration of the visit; patient perception of the quality of the information and care received; use of resources on drug prescriptions and sick leave; the patient’s preferences on which professional they would like to visit in case of a similar health problem. The co-variables were: Professional seen; primary care practice; reason for consultation; age; gender; previous polymedication (more than five drugs taken regularly).

**Validity and reliability**
The primary outcome, the patient satisfaction, consisted of a validated and reliable measurement tool (Catalan Ministry of Health & Catalan Health Service 2012). It was a pragmatic clinical trial conducted in clinical practice with real clinical situations. The study population was very similar to the adult population requesting same day appointments in primary care. All of this and the high number of GPs and nurses who participated in the study, ensure that the study had high external validity. The review and monitoring of the study protocol, the quality management of information, the coordination of field work and adverse effects related to the clinical trial were monitored by a clinical trial monitor.

**Ethical considerations**
Research Ethics Committee approval was obtained.

**Data analysis**
To evaluate the effectiveness of the intervention, an intention-to-treat analysis with a statistical significance level of 5% was performed. All of the randomized patients were included in the analysis.
Multilevel regression models with three levels were performed according to the following hierarchical structure: patients (level 1); nested in the professional (level 2); nested in the primary care practice (level 3). The multilevel regression models were performed using the GLLAMM function (Generalized Linear Latent and Mixed Models) in Stata 10-1 (StataCorp, College Station, Texas 77845 USA). Linear multilevel regression models were created for continuous response variables and multilevel logistic regression models were created for binary response variables. All models assumed that a random effect existed at both professional and practice levels. The fixed effects were estimated using odds ratios (95% CI) in the multilevel logistic regression and as mean differences (95% CI) in the multilevel lineal regression. Two different multilevel models were estimated for each of the response variables. The first model included the variable ‘group’ (intervention vs. control, unadjusted) and the second model, in addition to the variable ‘group’, also included the following variables: reason for consultation, gender, age, health status and polymedication (adjusted model).

Results

Participant flow

Of the 2,383 patients who requested a same day appointment, 1,461 (61.3%) were assigned to either the intervention or control group. Eight hundred and eight patients were excluded because they either did not meet the inclusion criteria or presented exclusion criteria and 114 were excluded because they either did not meet the inclusion or control group. Eight hundred and eight patients (61.3%) were assigned to either the intervention group (95% CI: 83.6–88.7) of the cases (Figure 2). The health problem that nurses solved with greatest ease was burns (90%; 95%CI: 86–92) followed by injuries (94%; 95% CI: 86–98) and acute diarrhoea (90%; 95% CI: 84–92). On the contrary, 17.5% (95% CI: 10–27) of low back pain, 16.09% (95% CI: 12–19) of visits for acute mild upper respiratory symptoms and 15.56% (95% CI: 7–28) of visits due to urinary discomfort were referred to the GP.

Use of resources

The mean visit duration by GPs was 3 minutes, as opposed to 6 minutes for visits by nurses (mean difference of 3; 95%CI: 1–4.924). Nurses prescribed drugs in 65.1% of cases vs. 84.8% prescribed by GPs (OR: 0.24; 95% CI: 0.16–0.35). Sick leave was prescribed in 15.7% of cases by nurses, as opposed to 18.7% by GPs. These differences were not statistically significant (OR: 0.79 95%CI: 0.57–1.10; Table 2).

Level of resolution of symptoms and satisfaction at the two-week follow-up

The ability to solve the health problem presented (OR: 1.1; 95%CI: 0.84–1.46) and the improvement in health status compared with the day of the visit (OR: 0.81: 95% CI: 0.53–1.24) were similar in both groups (Table 3). The percentage of patients that revisited for the same problem in any primary care practice was also similar in both groups (OR: 1.04: 95%CI: 0.77–1.41; Table 3).

When patients were asked about their preferences on which professional they would like to visit in case of a similar health problem, more than 40% of patients in each group expressed indifference. In the control group, 13.9% of patients would prefer to be seen by a nurse, as opposed to 20.9% in the intervention group (Table 4). The overall
satisfaction with the visit was 8.3 points in patients attended by a GP and 8.5 points in those attended by a nurse; however, these differences were not statistically significant (mean difference = 0.140; 95%CI: −0.126–0.407). When evaluating the degree of patient satisfaction with certain components of the visit, it was observed that, in general, patients attended by a nurse were more satisfied; however, these differences were either statistically insignificant or barely reached the limit of significance (Table 5).

**Adverse events**

There were no adverse events in any of the groups.

**Discussion**

The results of the study suggest that the quality of the care provided by nurses specifically trained to solve acute health problems of low complexity is comparable to that provided by GPs in terms of resolution of the problem 15 days after the visit, patient satisfaction with the visit and use of resources. The solving skills observed in nursing were higher than expected in the study hypothesis. The initial expectation was probably limited as nurse training in our area is, a priori, different to that in other countries with published studies. However, most of the health problems seen by nurses were resolved without the need of a GP referral. In 72.14% of the patients attended by nurses, the health problem was resolved following the corresponding protocol and without consulting the GP. These figures are similar to those observed in other studies, which oscillate between 73.0%–86.5% (Marsh & Dawes 1995, Shum et al. 2000). Our results are also similar to shown by a healthcare centre in our area, which observed a 63.9% resolution by the nurse (Brugues et al. 2008).

Being seen by nurses did not appear to be a problem for patients. Patients expressed a similar degree of satisfaction independently of which professional they saw and they believed that nurses had correctly resolved their problem, as has been seen in other studies (Laurant et al. 2004). This
Table 1 Baseline characteristics of patients and reasons for visit.

<table>
<thead>
<tr>
<th></th>
<th>Visited by physician (control group; N = 708)</th>
<th>Visited by nurse (intervention group; N = 753)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>38.6 (14.5)</td>
<td>39.0 (15.1)</td>
</tr>
<tr>
<td>Gender (female)</td>
<td>433 (61.2%)</td>
<td>459 (61.0%)</td>
</tr>
<tr>
<td>Perceived health</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excellent</td>
<td>60 (8.5%)</td>
<td>67 (8.9%)</td>
</tr>
<tr>
<td>Very good</td>
<td>195 (27.5%)</td>
<td>208 (27.6%)</td>
</tr>
<tr>
<td>Good</td>
<td>336 (47.5%)</td>
<td>385 (51.1%)</td>
</tr>
<tr>
<td>Regular</td>
<td>106 (15.0%)</td>
<td>83 (11.0%)</td>
</tr>
<tr>
<td>Bad</td>
<td>11 (1.6%)</td>
<td>10 (1.3%)</td>
</tr>
<tr>
<td>Poly-medicated patients</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(≥ 5 drugs; ≥ 6 months)</td>
<td>21 (3.0%)</td>
<td>20 (2.7%)</td>
</tr>
</tbody>
</table>

Reasons for visit
- Minor skin burns: 13 (1.8%) vs. 15 (2.0%)
- Urinary discomfort: 30 (4.2%) vs. 45 (6.0%)
- Injury: 75 (10.6%) vs. 71 (9.4%)
- Low back pain: 79 (11.2%) vs. 80 (10.6%)
- Acute diarrhoea: 113 (16.0%) vs. 131 (17.4%)
- Acute mild upper respiratory symptoms: 398 (56.2%) vs. 411 (54.6%)

*Data are means (SD) or numbers (%).

The above findings are confirmed by the fact that less than 15% of patients in both groups revisited for the same reason. Patients were slightly more satisfied with some aspects of the visit when visiting with nurses; however, this did not necessarily mean that the patients prefer nurses over GPs. Some patients preferred to visit a nurse, while others preferred to visit a GP. This could be related to patients’ habit of visiting the GP, and to the perceived severity of the problem; it is probable that patients prefer the GP when they consider the problem to be serious and nurses when they consider it to be mild. Even so, in the intervention group, nurses prescribed fewer drugs than GPs (65.1% vs. 84.8%). In previously published studies, statistically significant differences were not observed in drug prescription between GPs and nurses (Laurant et al. 2004). In our study, nurses could only prescribe drugs that the decision-making support tool allowed according to the signs or symptoms that the patient presented. GPs did not use any specific protocol that suggested which prescription to use nor that gave them any help. This factor should be considered when reproducing the intervention, as part of the results could be due to the tool. On the other hand, when the complexity of cases and health problems were similar, the percentage of drugs prescribed by the physicians in our study (84.8%) was much higher than the percentage prescribed in other studies (61–63%) (Shum et al. 2000, 2002).

Figure 2 Level of resolution by nurses.

Table 2 Use of resources during visit in control group and intervention group.

<table>
<thead>
<tr>
<th></th>
<th>Visited by physician (control group; N = 708)*</th>
<th>Visited by nurse (intervention group; N = 753)*</th>
<th>Multilevel analysis (N = 1,461)**</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Unadjusted OR/MD (95% CI)</td>
</tr>
<tr>
<td>Patients analysed</td>
<td>669</td>
<td>743</td>
<td>1,461</td>
</tr>
<tr>
<td>Duration of the visit (minutes)</td>
<td>3 (1–6)</td>
<td>6 (3–10)</td>
<td>3·208 (1·463–4·953)</td>
</tr>
<tr>
<td>Patients with prescribed drugs</td>
<td>567 (84.8%)</td>
<td>484 (65.1%)</td>
<td>0·28 (0·20–0·28)</td>
</tr>
<tr>
<td>Patients with sick leave</td>
<td>125 (18.7%)</td>
<td>117 (15.7%)</td>
<td>0·79 (0·58–1·07)</td>
</tr>
</tbody>
</table>

*Data are medians (interquartile range) or numbers (%).

**Multilevel analysis by intention to treat, including the variability due to the professional that sees the patient and the variability due to the primary care practice that the professional belongs to.

***OR (Nurses/General practitioners); odds ratio. MD (Nurses-Physicians): mean differences. Adjusted for the following variables: reason for visit, gender, age, general state of health and poly-medication.

****Mean differences (95% CI), multilevel linear regression model.

*****Odds ratios (95% CI), multilevel logistic regression model.
Table 3 Visit resolution.

<table>
<thead>
<tr>
<th></th>
<th>Visited by physician (control group; N = 708)*</th>
<th>Visited by nurse (intervention group; N = 753)*</th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Unadjusted OR (95%CI)</strong></td>
<td><strong>Unadjusted OR (95%CI)</strong></td>
<td></td>
</tr>
<tr>
<td>Patients analysed</td>
<td>641</td>
<td>710</td>
<td>1,461</td>
</tr>
<tr>
<td>Patients that report that their health problem has been solved</td>
<td>543 (84.7%)</td>
<td>616 (86.8%)</td>
<td>1.13 (0.84–1.50)</td>
</tr>
<tr>
<td>Patients' assessment on the state of the health problem after 15 days</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improved</td>
<td>586 (91.4%)</td>
<td>661 (93.1%)</td>
<td>1</td>
</tr>
<tr>
<td>The same or worse</td>
<td>54 (8.4%)</td>
<td>48 (6.8%)</td>
<td>0.79 (0.52–1.21)</td>
</tr>
<tr>
<td>Patients that report having returned to primary care for the same reason</td>
<td>79 (12.3%)</td>
<td>90 (12.7%)</td>
<td>1.03 (0.76–1.34)</td>
</tr>
<tr>
<td>Patients that report having gone to a hospital emergency room</td>
<td>13 (2.0%)</td>
<td>14 (2.0%)</td>
<td>****</td>
</tr>
</tbody>
</table>

*Data are numbers (%). **OR (Nurses/Physicians). Multilevel analysis by intention to treat, including the variability due to the professional that sees the patient and the variability due to the primary care practice that the professional belongs to. ***All of the models were multilevel logistic regressions which were adjusted for the following variables: reason for visit, gender, age, general state of health and poly-medication. ****The available data did not permit this calculation.

Table 4 Future intention about seeing a professional.

<table>
<thead>
<tr>
<th></th>
<th>Visited by physician (control group)</th>
<th>Visited by nurse (intervention group)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Future preference</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physician</td>
<td>271</td>
<td>42.3%</td>
</tr>
<tr>
<td>Nurse</td>
<td>89</td>
<td>13.9%</td>
</tr>
<tr>
<td>Would not return</td>
<td>11</td>
<td>1.7%</td>
</tr>
<tr>
<td>Indifferent</td>
<td>270</td>
<td>42.1%</td>
</tr>
<tr>
<td>Total</td>
<td>641</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Table 5 Grade of patient satisfaction with respect to the visit after 15 days.

<table>
<thead>
<tr>
<th></th>
<th>Visited by physician (control group; N = 708)*</th>
<th>Visited by nurse (intervention group; N = 753)*</th>
<th>Multilevel analysis (N = 1,461)**</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Unadjusted mean difference (95CI%)</strong></td>
<td><strong>Adjusted mean difference (95CI%)</strong>*</td>
<td></td>
</tr>
<tr>
<td>Patients analysed</td>
<td>641</td>
<td>710</td>
<td>1,461</td>
</tr>
<tr>
<td>Overall satisfaction with the visit (0–10)</td>
<td>8.3 (1.7)</td>
<td>8.5 (1.7)</td>
<td>0.148 (−0.123–0.419)</td>
</tr>
<tr>
<td>Satisfaction with duration of the visit (0–10)</td>
<td>8.1 (1.7)</td>
<td>8.4 (1.6)</td>
<td>0.266 (0.025–0.506)</td>
</tr>
<tr>
<td>Satisfaction with personal attention (0–10)</td>
<td>8.6 (1.6)</td>
<td>8.8 (1.4)</td>
<td>0.241 (0.004–0.478)</td>
</tr>
<tr>
<td>Satisfaction with explanations and information received in the visit (0–10)</td>
<td>8.3 (1.7)</td>
<td>8.5 (1.6)</td>
<td>0.247 (0.014–0.500)</td>
</tr>
</tbody>
</table>

*Data are means (SD). **Mean difference(Nurses-Physicians). Multilevel analysis by intention to treat, including the variability due to the professional that sees the patient and the variability due to the primary care practice that the professional belongs to. ***All of the models were multilevel lineal regressions which were adjusted for the following variables: reason for visit, gender, age, general state of health and poly-medication.
The longer duration of visits by nurses than physicians should be interpreted carefully. It is possible that the obtained durations present a problem of validity because they were automatically calculated by the electronic application from the moment that the professional entered the visit screen until exiting it. Visits with short durations could indicate that the professional first conducted the visit and later completed the fields in the electronic application. Furthermore, nurses were required to fill out more fields in the application, which could also contribute to increase the visit duration. Therefore, the longer duration of visits by nurses could be biased by the above mentioned confounding factors and may not be due to longer visits by nurses as has been previously observed (Laurant et al., 2004). In this way, the results appear to be consistent, as patients attended by nurses appear to be more satisfied with the time dedicated in the visit than patients attended by GPs. Although these results are statistically significant, they may not be clinically relevant.

The percentage of patients who did not complete the follow-up was low and equally distributed in both groups. Furthermore, there was high variability in the number of participating professionals and patients attended in each practice. All of these aspects have been taken into account in the sample size calculation, and in the multivariate analysis. To reduce possible biases, the analysis was done with intention to treat; variability between professionals and practices was included through a multilevel analysis. The resolution of problems is high in both groups and this is probably because the included health problems tend to be banal and self-limiting in nature and, in many cases, resolve spontaneously. We should ask ourselves whether it is acceptable for these kinds of problems to occupy a place in the agendas of GPs and nurses, or whether patients should be encouraged to allow some time for these problems to settle before consulting a doctor/nurse. This is in contrast to the perception of patients, as <2% of them would forego the healthcare system if they found themselves in a similar situation.

The selection of the range of health problems that nurses are trained to treat is one of the most complicated aspects. It seems reasonable to start with the most frequent problems that can be resolved by nurses. In our study, the selected and protocolized reasons for consultation were based on data from more than 23 million visits in 2006 in all of the primary care practices of the ICS. The selected reasons were consistent with the ones described in the bibliography; therefore, upper respiratory diseases, low back pain and diarrhoea are the most frequent reasons for same day appointments in primary care. Developing appropriate protocols for these problems, and their gradual introduction, could help to foster patient trust and the support of GPs and nurses who are reluctant to change.

The fact that nurses resolve certain reasons for consultation with the same security as general practitioners, could allow better and more efficient management of the demand for care. Sharing visits between general practitioners and nurses will allow increasing professional competencies in nursing.

This study could help to reduce resistance to change in both family physicians and nurses, as well as in the general population, generating confidence.
referred. Nowadays, there are many health organizations that have incorporated the resolution of low complexity pathologies into nursing. This study could help to reduce resistance to change in both physicians and nurses, and in the general population, generating confidence. We believe that it is positive to generate a culture of evaluation before incorporating new organizational changes.

Limitations

Although the study was designed to be pragmatic and close to daily practice, the profile of professionals and patients included could differ from the profile usually found, as tends to be the case in clinical trials. For this reason, when applying a similar intervention in a real environment, factors such as nurse training, the availability of decision-making support tools and the selection of patient profiles that can be solved by nurses should be taken into consideration. It should be noted that there was variability in the resolution of health problems between participating healthcare centres and between reasons for consultation included in the study. Low back pain, acute mild upper respiratory symptoms and urinary discomfort presented inferior levels of resolution. This lower resolution could be explained by the fact that these problems require more complex physical examinations that are not usual in a nurse’s daily work.

Conclusion

Spanish nurses trained specifically in the resolution of acute health problems of low complexity give quality care comparable to that provided by GP in terms of resolution of the problem 15 days after the visit and in patient satisfaction. Nurses prescribed fewer drugs than GPs probably because nurses could only prescribe drugs that the decision-making support tool allowed according to the signs or symptoms that the patient presented. There was variability in the resolution of health problems between participating health centres and between reasons for visits included in the study. Low back pain, acute mild upper respiratory symptoms and urinary discomfort presented inferior levels of resolution.

Acknowledgements

Ester Botella provided invaluable support during all stages of this study. Thanks are also owed to the patients, nurses, doctors and administrative staff who took part in this study.

Trial registration

Identifying number: NCT00461201.

Funding statement

This project was funded by the Health Research Fund, Carlos III Health Institute from Ministry of Science and Innovation (project number: PI060715).

Conflict of interest

No conflict of interest has been declared by the authors.

Author contributions

All authors have agreed on the final version and meet at least one of the following criteria (recommended by the IC-MJE*):

- substantial contributions to conception and design, acquisition of data or analysis and interpretation of data;
- drafting the article or revising it critically for important intellectual content.

*http://www.icmje.org/ethical_1author.html.

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