

Efficacy of nurse practitioner management of primary care emergency visits

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Objective: To assess the efficacy of nurse practitioner management of emergency visits by means of consensus protocols integrated into the computerized medical record system of a primary health care center.

Methods: Descriptive, cross-sectional, retrospective study. All patients seeking appointments for same-day care within a semiurban health care district in the province of Girona, Spain, were included consecutively between March 15 and April 15, 2010. We evaluated the nurses' application of the appropriate computerized practice protocols in the system. Sociodemographic variables (age, sex, country of origin), care variables (reason for the visit), and nurse variables (seniority, place of work) were analyzed. The nurses' efficacy was evaluated on the basis of revisits within 48 hours or the need for referral to another care provider.

Results: A total of 296 visits were included. The mean (SD) patient age was 34.4 (25.5) years; 53.3% were women and 25.3% were immigrants. Open wounds (12.5%) were the main reason for seeking care. No revisits within 48 hours were needed in 77.4% of the cases (80.5% of those treated by protocol did not revisit vs 73.2% of those whose care was not protocol-guided, $P=.14$). Conditions treated by protocol (57.1% of the visits) generated fewer referrals to another professional (33.1% of protocol-guided visits were referred vs 64.6% of nonprotocol-guided visits, $P<.001$). Immigrants made fewer revisits for problems treated by protocol (12.1% revisited vs 29.4% when no protocol was used, $P=.04$). Younger patients revisited less often (mean age of 31.5 [24] years for patients not revisiting vs 41.1 [25] years for revisitors, $P=.04$).

Conclusions: The ability of the nursing staff to manage primary care emergency visits is high. Nurse practitioner efficacy increases when a computerized protocol is available to assist in managing a case. [Emergencias 2012;24:196-202]

Key words: Nursing. Clinical protocols. Emergency health services.

Introduction

The demand for urgent attention in primary care (PC) has increased in recent years^{1,2}, due to various causes: a) an increasingly elderly population with more comorbidity and also health system dependency, b) population increase related with migration, c) growing medicalization of life which means that many problems previously re-

solved in other environments are now reasons for medical consultation and finally, d) a growing demand for immediate response by patients who cannot wait for scheduled appointments with their regular doctor^{3,4}. Besides, PC reform of the 1980s encouraged redirecting demand towards medical consultation, even for non-health related problems⁵.

Numerous studies have addressed the factors

underlying the growing demand for urgent attention. Among these, there are studies on user profiles^{6,7}, country of origin^{8,9}, the characteristics of frequent users^{10,11}, the effect of times¹¹ or the retransmission of sporting events¹². But patient anxiety and the subjective perception of severity appears to be the main factor that determines the demand for urgent medical attention². Some studies have examined the effectiveness of selected interventions to reduce non-urgent visits¹³ and others have investigated patient reasons for visiting hospital emergency departments (EDs)².

When reviewing patient reasons for consultation at PC centers (PCC), it has been found that 45-50% were for administrative queries, 25-30% for normal medical consultation and 20-30% for unforeseeable care demand¹⁴. This distribution of the reasons for consultation may contribute to family physician overload, making it difficult to attend urgent consultations. Consequently, greater demand is generated at other facilities such as hospital EDs, with a high probability of revisits^{15,16}.

Forecasts for the health system indicate a greater flow of patients previously attending hospital services with health problems towards PCCs, for technical aspects (control of oral anticoagulation, ultrasound, retinography, etc.) and monitoring of certain diseases in combination with hospital services. Although electronic prescription can reduce predictable bureaucratic reasons for consultation, there are other threats to the system, such as the decline in economic resources and less availability of doctors for PCCs. To improve the attention of both scheduled and urgent patients, alternatives have been proposed which involve patient attention without the presence of physicians^{4,5,14}. These include increasing the role of nurses in PC, as in other countries with the figure of the nurse practitioner^{17,18}.

Several studies and reviews have shown a high level of patient satisfaction in the resolution of urgent consultation for non-severe clinical problems by nurses, as well as low levels of drug prescription, little need of referral to family physicians and a low percentage of new queries for the same reason¹⁷⁻²⁰. For some years, the Institut Català de la Salut (ICS) has incorporated agreed protocols in the electronic medical record (e-MR) for nurses to assume responsibility for certain health problems²¹. However, its implementation is a complicated issue, full of prejudice⁵ and also, studies to determine its efficiency are lacking. In this context, the aim of our study was to evaluate the efficiency of initial nurse resolution of urgent consul-

tation using the e-MR protocols and analyzing the influence of different sociodemographic and health care variables.

Method

We performed a descriptive, transversal and retrospective study in a basic healthcare area (ABS in Spanish) of the ICS, in a semi-urban area of the province of Girona with 2 PC centers serving 12,376 people in two towns (Arbúcies and Sant Hilari). Each PCC is staffed by 4 "units of basic attention" (UBA) of family physicians (MF in Spanish) and one UBA of pediatricians (PED) for approximately 6,000 inhabitants in each town. We included in the study all consecutive urgent consultations (PED and MF) in both populations, initially assessed by nurses, between 15 March and 15 April 2010. The demand for urgent consultation was assigned to nursing staff if the patient had no scheduled appointment with their regular physician that day and did not want to delay the consultation. We excluded all nursing visits without an appointment generated from the physician's consulting room.

We assessed nurse application of the agreed protocol of action in the e-MR derived directly from the user attention unit. This protocol had been previously agreed between ABS management, the UAU and ABS physicians and nurses in 2007. All health professionals have access to protocols via a specific icon on the computer screen. Medical history and physical examination are included in the protocol on reason for visit, to determine whether the patient's clinical condition is non-urgent or if there any signs or symptoms of alarm to generate referral to another health professional²¹.

The study variables were sociodemographic (age, sex and country of origin) and medical (PCC or UBA source of the patient, reason for visit, and nurse seniority in the UBA). Nursing staff effectiveness in resolving spontaneous visits was assessed by analysis of revisits for the same reason within 48 hours and referral to another professional. Revisits attributable to nursing staff were considered to be those where the patient was not referred to a physician, regardless of whether the reason for the visit was in the protocol or not.

Quantitative variables are expressed as mean and standard deviation, and qualitative variables as percentages. Quantitative variables were compared using Student's t test and for qualitative variables we used Pearson's chi-square test. Differ-

ences with a p value less than 0.05 were considered statistically significant. All analyses were performed using SPSS 15.0.

Results

During the study period we recorded 296 urgent visits initially attended by nurses. Mean patient age was 34.4 years (SD = 25.5 years), 53.3% women and 25.3% immigrants. The remaining variables are shown in Table 1.

Protocolized reasons for visits accounted for 57.1% ; injuries (21.9%), odynophagia (14.2%) and lower back pain (11.2%) were the most common reasons (Table 2). The remaining 42.9% were for reasons not included in the protocol, the main ones being: trauma (20.5%), musculoskeletal pain (12.6%) and abdominal pain (9.4%), as shown in Table 3.

The percentage of revisits per reason are shown in Table 2 (protocol-guided reasons) and Table 3 (non-protocol-guided reasons). Overall, 77.4% of urgent visits attended by PC nurses did not revisit for the same reason within 48 hours, with no statistically significant differences between protocol-guided and non-protocol-guided health problems (80.5% vs 73.2%) respectively, odds ratio 1.2, confidence interval (CI) 95%, 0.92 to 1.57, P = 0.14) (Figure 1). In the subgroup of patients not referred to physicians (exclusively attended by a nurse), 15.9% of patients attended for protocol-guided reasons revisited, compared to 22.2% attended for non-protocol-guided reasons (odds ratio 1.13, 95% CI, 0.84 to 1.52; p = 0.35).

The percentage of referrals to physicians for each reason for visiting is shown in Table 2 (pro-

Table 1. Characteristics of patients (n = 296) attended by primary care nurses

| Variables | Values |
|---|-------------|
| Age (years) (mean ± SD) | 34.4 ± 25.6 |
| Gender (female) | 53% |
| Patients of immigrant origin | 25.3% |
| Primary Care Center | |
| Arbúcies | 69.6% |
| Sant Hilari | 30.4% |
| Units of basic attention | |
| Pediatrics | 29.7% |
| Adults | 63.5% |
| Displaced (pediatric & adult patients) | 6.8% |
| Nursing seniority (years of ABS working experience) | |
| 0-5 years | 29.7% |
| > 5 years | 70.3% |
| Protocol-guided reasons for visit | 57.1% |

SD: standard deviation, ABS: basic healthcare area.

col-guided reasons) and Table 3 (non-protocol-guided). Overall, 46.6% of spontaneous visits attended by PC nurses were referred to a physician, 33.1% for protocol-guided reasons and 64.6% for non-protocol-guided reasons (odds ratio, 2.1; 95% CI, 1.57 to 2.76, P < 0.001) (Figure 1).

As for revisit attribution, 28 of 158 patients (17.7%) attended solely by a nurse revisited within 48 hours. Taking into account only those with protocol-guided problems, 15.9% were nurse-attributable revisits (Figure 2). In contrast, 39 of 138 patients were attended initially by a nurse and then referred to a physician, so 28.8% were physician-attributable revisits.

The variables showing significant differences were age (31.6 ± 2 years "non-revisiting group" versus 41.1 ± 25.4 years for the "revisiting group" (P = 0.04) and being of immigrant origin (12.1% vs 29.4% respectively, p = 0.04). The remaining variables analyzed showed no statistically signifi-

Table 2. Protocol-guided reasons for visit (n = 169), percentage of revisits and referrals for each reason

| Reason for visit | Total n (%) | Revisits < 48 h n (%) | Referrals n (%) |
|--|-------------------|--------------------------|--------------------|
| 1. Skin alterations (folds/diapers) | 1 (0.6%) | 0 (0%) | 0 (0%) |
| 2. Colic | 3 (1.8%) | 0 (0%) | 0 (0%) |
| 3. Diarrhea/acute diarrhea in children | 13 (7.7%) | 2 (15.4%) | 4 (30.8%) |
| 4. High blood pressure | 4 (2.4%) | 1 (25%) | 2 (50%) |
| 5. Wounds | 37 (21.9%) | 7 (18.9%) | 13 (35.1%) |
| 6. Odynophagia | 24 (14.2%) | 6 (25%) | 7 (29.2%) |
| 7. Upper airway respiratory symptoms | 18 (10.7%) | 1 (5.5%) | 8 (44.4%) |
| 8. Red Eye | 7 (4.1%) | 1 (14.2%) | 4 (57.1%) |
| 9. Anxiety attack | 7 (4.1%) | 5 (71.4%) | 3 (42.9%) |
| 10. Emergency contraception | 2 (1.2%) | 0 (0%) | 0 (0%) |
| 11. Burns / pediatric burns | 5 (3%) | 0 (0%) | 0 (0%) |
| 12. Mechanical low back pain | 19 (11.2%) | 3 (15.7%) | 5 (24.3%) |
| 13. Epistaxis | 0 (0%) | 0 (0%) | 0 (0%) |
| 14. Urinary tract symptoms | 10 (5.9%) | 2 (20%) | 3 (30%) |
| 15. Toothache | 10 (5.9%) | 4 (40%) | 3 (30%) |
| 16. Sprained ankle | 9 (5.3%) | 1 (11.1%) | 4 (44.4%) |
| Total | 169 (100%) | 33 (19.5%) | 56 (33.1%) |

Table 3. Visits for reasons not included in the protocol (n = 127), percentage of revisits and referrals for each reason

| Reason for visit | Total n (%) | Revisits < 48 h n (%) | Referrals n (%) |
|--|-------------------|--------------------------|--------------------|
| 1. Trauma / contusion | 26 (20.5%) | 5 (19.2%) | 15 (57.7%) |
| 2. Musculoskeletal pain | 16 (12.6%) | 6 (37.5%) | 4 (25%) |
| 3. Abdominal pain | 12 (9.4%) | 2 (16.7%) | 9 (75%) |
| 4. Fever | 10 (7.8%) | 5 (50%) | 5 (55.6%) |
| 5. Skin rash | 8 (6.2%) | 0 (0%) | 6 (75%) |
| 6. Dizziness | 7 (5.4%) | 1 (14.3%) | 6 (85.7%) |
| 7. Dyspnea | 4 (3.1%) | 2 (50%) | 4 (100%) |
| 8. Constipation | 3 (2.4%) | 1 (33.3%) | 1 (33.3%) |
| 9. Chest pain | 3 (2.4%) | 2 (66.7%) | 3 (100%) |
| 10. Other (hematuria, palpitations, etc) | 38 (29.9%) | 10 (26.3%) | 29 (76.3%) |
| Total | 127 (100%) | 34 (26.7%) | 82 (64.6%) |

cant differences in revisiting for the same reason within 48 hours (Table 4).

Discussion

The main result of the study was that PC nurse capacity to resolve urgent health problems on demand was high and effective. Overall, 77.4% of the emergency visits attended by PC nurses were resolved without further visits for the same reason within 48 hours. Taking into account only those cases with protocol-guided problems, the rate of resolution increased to 80.5%. In addition, some of the referrals for protocol-guided reasons were due to the presence of certain signs or symptoms of alarm, such as fever in cases of urinary tract infection. Therefore, a nurse-attributable revisit was that where the patient was attended for a protocol-guided reason and not referred to a physician: resolution of these consultations was 84.1% (Figure 1). The overall referral rate was 46.6%, but this decreased to 33% if the reason for the visit was in the protocol.

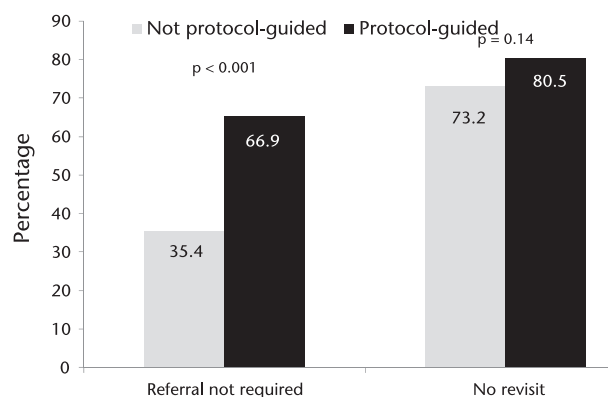


Figure 1. Percentage of "non-referrals" and "non-revisits," according to whether the reason for the visit was included in the protocol or not.

The present study showed that 42.9% of the problems attended by PC nurses were not in the protocol, and the patients with these problems should have been referred initially to a family physician. This may explain the higher rate of referrals for non-protocol-guided problems (64.6% vs 33.1%). However, there were no differences in the rate of patients who did not revisit for the same reason within 48 hours (15.9% for protocol-guided problems versus 22.2% for non-protocol-guided problems). This suggests that nurses can also resolve other health complaints that could be agreed and included in the protocol, thus expanding the protocol-guided reasons for spontaneous visits adapted according to the incidence and impact of the complaint in geographical area.

The fact that nurses resolved 84.1% of visits indicates their capacity in this regard and supports e-PCC protocols and recommendations made by ICS²¹. This is important at this juncture when for the first time there are calls to fill places for family and community nurses in multi-disciplinary teaching units^{22,23} and this should be an opportunity to strengthen teamwork in primary care. On the other hand, it seems inappropriate that PC nurses assume the task of urgent attention because the family physician is overloaded. They should only be assigned to handle problems agreed by all and included in the protocols.

Younger patients and those of immigrant origin showed a significantly lower rate of revisits. Regarding the former group, the reason may be that pediatric patients were included in the study and they more frequently present with milder conditions. The influence of immigrants on the use of health resources has been widely debated and the subject of research with widely discordant results^{8,9,24}, but job insecurity in many of them may hinder revisits to the PC center.

The results of this study are consistent with those of previously published studies¹⁸⁻²⁰ highlighting the ability of nurses to successfully deal with

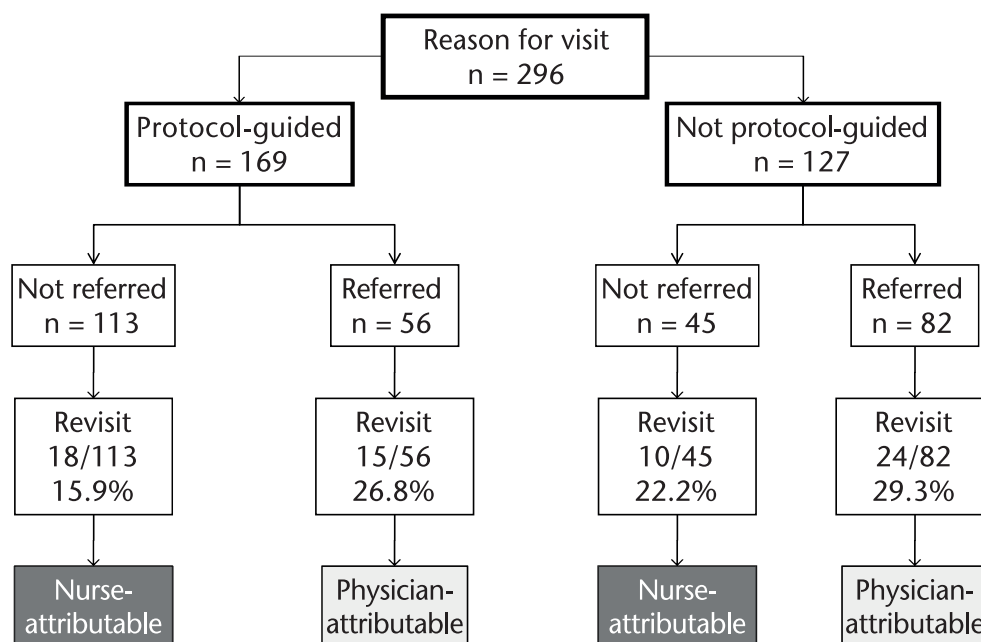


Figure 2. Revisits within 48 hours according to whether the reason for the visit was included in the protocol or not, and whether the revisiting patient was referred to the physician or not.

certain types of disease, especially those agreed on by the PC team. But the different study designs and periods used to assess revisits¹⁸ makes results difficult to compare.

This study has two important elements we would highlight. First, it evaluated a very demanding healthcare population with a high number of pediatric patients, and second, the study was performed in a basic healthcare area with two PC centers attending a semi-urban population. These two facts also differentiate it from that by Brugués et al¹⁸. At the same time, our study has certain limitations. The first is not having a reference or standard on what is the optimal percentage of patients not revisiting after urgent PC attention, in order to be able to judge the effectiveness of nurse intervention. In our case and

based on the literature, we considered our intervention effective since three out of four patients treated did not revisit and two out of four were not referred to other professionals (and the protocol specifies referral for some problems). Another possible limitation was our use of a 48-hour period to define a revisit; a period of 72 hours is an indicator of quality in urgent consultation²⁵, but we decided on 48 hours due to the low complexity of problems and reasons for urgent visits in our PC centers, many being of an administrative nature where there is no delay in attention. Another limitation was not being able to determine whether our patients revisited elsewhere within 48 hours. In any case, it should be noted that the study was performed in a semi-urban area and 93.2% of treated patients were registered in the health area.

The results of this work may have more general utility and applicability. From an economic standpoint, the health service is one most citizens value most and are most concerned about, especially in times of economic crisis. At the same time, increased health spending is a source of major concern to our governments. Cost-effectiveness studies of such nurse intervention have not been performed in Spain but in the UK, Curtis et al. reported a 60% increase in costs of urgent attention by general physicians, work nurses could do in the area of PC²⁶. The other potential benefit lies in organizational aspects and patient attention.

Table 4. Comparison of the different variables analyzed regarding revisits within 48 hours for urgent attention for reasons included in the protocol (n = 169)

| Variables | No revisits % | Revisits % | p |
|--|------------------|---------------|------|
| Age (years) (mean ± SD) | 31.6 ± 24 | 41.1 ± 25.4 | 0.04 |
| Female gender | 60.3% | 51.5% | 0.35 |
| Patients of immigrant origin | 29.4% | 12.1% | 0.04 |
| Arbúcies primary care center | 76.5% | 66.7% | 0.24 |
| Pediatric unit of basic healthcare | 30.9% | 24.2% | 0.45 |
| Nurse seniority (<5 years of ABS working experience) | 25.7% | 33.3% | 0.38 |

SD: standard deviation, ABS: basic healthcare area.

The fact that nurses, supported by agreed protocols, can deal with certain urgent visits may lead to better patient access to the family physician. Based on the data obtained in this study, we estimate that, in one month, nurse intervention saved the PC family physician from having to attend nearly 130 patient visits (discounting revisits). This improvement could also help reduce attendance for mild complaints at hospital EDs. However, there is one study, performed in Spain, indicating that improving access to PC health centers does not reduce attendance at hospital EDs, but rather both increase together²⁷.

Further studies are needed to analyze the long-term effects of such an intervention on urgent PC attendance within an ABS and on hospital EDs in the same territory, or patient and participant satisfaction. In conclusion, we believe a greater role for PC nurses in protocol-guided urgent attention is effective and, in this study, showed high capacity for resolution of these cases. Likewise, such intervention could help promote PC teamwork, providing a new impetus to new generations of family and community nurses and contribute to the efficiency of PC centers and the health system in general.

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Evaluación de la eficacia de enfermería en la resolución de las consultas urgentes en atención primaria

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Objetivo: Evaluar la eficacia de enfermería en la resolución de las consultas urgentes en atención primaria (AP) mediante la aplicación de los protocolos incorporados a la historia clínica informatizada (e-CAP).

Método: Estudio descriptivo, transversal y retrospectivo. Se incluyeron de forma consecutiva todos los pacientes que solicitaron una consulta urgente para el mismo día en una área básica de salud (ABS) semiurbana de la provincia de Girona, entre el 15 de marzo al 15 de abril de 2010. Se valoró la aplicación por parte de enfermería de los protocolos de actuación consensuados para la atención de los motivos de consulta urgentes protocolizados en el e-CAP. Se analizaron las variables sociodemográficas (edad, sexo, país de origen), asistenciales (motivo de consulta) y de enfermería (antigüedad, lugar de trabajo). La eficacia de enfermería se valoró mediante el análisis de las re-consultas en menos de 48 horas y por las derivaciones a otro profesional.

Resultados: Se analizaron 296 consultas. La edad media fue de $34,4 \pm 25,5$ años, 53,3% fueron mujeres y 25,3% inmigrantes. El principal motivo de consulta fueron las heridas (12,5%). El 77,4% no reconsultó en las primeras 48 horas (80,5% motivos de consulta protocolizados vs 73,2% no protocolizados, $p = 0,14$). Los motivos protocolizados (57,1% de las consultas) tuvieron un menor porcentaje de derivación a otro profesional (33,1% protocolizados vs 64,6% no protocolizados $p < 0,001$). La reconsulta en los motivos protocolizados fue menor en inmigrantes (12,1% vs 29,4% $p = 0,04$) y en los pacientes más jóvenes ($31,6 \pm 24$ años vs $41,1 \pm 25,4$ años $p = 0,04$).

Conclusión: Enfermería tiene una alta capacidad de resolución de las consultas urgentes en AP. La eficacia de enfermería aumenta cuando atiende las consultas urgentes con un motivo de consulta protocolizado en el e-CAP. [Emergencias 2012;24:196-202]

Palabras clave: Enfermería. Protocolos. Urgencias.