

Effectiveness of participatory-action-research to put in practice evidence at a nursing onco-hematology unit¹

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The aim was to evaluate the effectiveness of evidence implementation through participatory-action research (PAR). A prospective quasi-experimental design with two non-equivalent and non-concurrent groups (2006 and 2008) was adopted. The research was conducted at the bone marrow transplant unit of a tertiary-level Spanish hospital. To put the evidence in practice, PAR was adopted as an "intervention studied". The dependent variables were: professional performance and patient outcomes (psycho-emotional area and adverse effects). In total, 125 patients were recruited (1st period=56; 2nd period=69). The results in the second period show significant improvements in professional performance in terms of the quality of the registers of signs and symptoms. In the psycho-emotional area, the psycho-social adjustment improved significantly; without caregiver burden or satisfaction showing any clear tendencies. Among the adverse effects, catheter-related thrombosis and catheter-related infection improved significantly; there were no significant differences in the level of pain or mucositis. Through the PAR, evidence could be put in practice and the outcomes under analysis could be improved.

Descriptors: Evidence-Based Nursing; Comparative Effectiveness Research; Oncologic Nursing; Hematologic Diseases.

¹ Paper extracted from project "Análisis de la efectividad de la implantación de un modelo de Enfermería Basada en la Evidencia, mediante una investigación-acción-participante, en una unidad de oncohematología". Suported by Fondo de Investigación Sanitaria (PI051330).

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Avaliação da efetividade da aplicação de evidências por meio de pesquisa-ação-participante em uma unidade de enfermagem hematológica

O objetivo deste estudo foi avaliar a efetividade da aplicação de evidências pela pesquisa-ação-participante (PAR). Como método usou-se o desenho quase-experimental prospectivo, com dois grupos não equivalentes e concorrentes (2006-2008), em uma unidade de enfermagem para transplante de medula óssea de hospital terciário espanhol. A intervenção estudada foi a integração de evidências pela PAR. As variáveis dependentes estudadas foram: o desempenho profissional e os resultados de saúde nos pacientes (área psicoemocional e efeitos adversos). Recrutaram-se 125 pacientes (Grupo 1=56, Grupo 2=69). Pôde-se observar pelos resultados melhora significativa no segundo grupo, na qualidade dos registros de enfermagem na avaliação de sinais e sintomas do paciente. Na área psicoemocional, o ajuste psicossocial do paciente melhorou significativamente, porém, nenhuma mudança foi observada na sobrecarga do cuidador ou satisfação do paciente. Em relação aos efeitos adversos, tanto o bloqueio quanto a infecção relacionada ao cateter melhoraram significativamente, mas não foi encontrada nenhuma diferença na dor nem na mucosite. Conclui-se que a PAR tem servido para apresentar evidências e melhorar os resultados de saúde.

Descritores: Enfermagem Baseada em Evidências; Pesquisa Comparativa de Efetividade; Enfermagem Oncológica; Doenças Hematológicas.

Evaluación de la efectividad de la implantación de evidencias mediante una investigación-acción-participante en una unidad de enfermería oncohematológica

La finalidad fue evaluar la efectividad de la implantación de evidencias mediante una investigación-acción-participante (IAP). Diseño cuasi-experimental prospectivo con dos grupos no equivalentes ni concurrentes (2006 a 2008) en una unidad de enfermería de trasplante de medula ósea de un hospital español de tercer nivel. La intervención estudiada fue la implantación de evidencias mediante una IAP. Las variables dependientes: desempeño profesional y resultados de salud (área psico-emocional y efectos adversos). Se reclutaron 125 pacientes (1^{er} grupo=56; 2^o grupo=69). Se aprecia una mejoría significativa en el segundo grupo en la calidad de los registros de valoración de signos y síntomas. En el área psico-emocional, el ajuste psico-social mejora significativamente; no hay cambios en la sobrecarga ni la satisfacción. En efectos adversos, la obstrucción e infección relacionada con catéter mejoran significativamente; no hay diferencias en dolor y mucositis. La IAP ha servido para implantar evidencias y mejorar los resultados de salud.

Descriptorios: Enfermería Basada en la Evidencia; Investigación sobre la Eficacia Comparativa; Enfermería Oncológica; Enfermedades Hematológicas.

Introduction

In the health area, compiling evidence is mandatory, given the enormous amount of knowledge production that is neither applied nor used⁽¹⁾.

Staying perfectly up-to-date, however, is a huge task for clinicians if they try to do this in isolation. Current trends are much more realistic and tend to

consider “creators” and “users” of evidence the former have already digested, summarized and evaluated⁽²⁻³⁾.

In health, Evidence-Based Practice (EBP) has turned into an international trend, which will play a key role to improve health organizations⁽⁴⁾. Using EBP is not exclusively achieved through increased knowledge, but demands a change in attitudes and conducts⁽⁵⁻⁶⁾.

Although the initial proposal of this new health care philosophy dates back more than 15 years⁽⁷⁾, we need to continue investigating the effectiveness of its use and the mechanisms needed to put it in practice. Extensive literature exists about recommendations for the implementation of evidence in practice and the assessment of different interventions⁽⁸⁻¹⁰⁾.

To actually and effectively achieve the implementation of evidence in the complex reality of clinical practice (CP), we need to understand the mechanisms that motivate changes in the organization and its teams. The necessary research should involve professionals and researchers as a whole, through an action process that needs to involve experience and reflection to be able to improve or change practices. This type of research is called “participatory-action-research” (PAR)⁽¹¹⁾ and has already been used as a means to implement evidence in CP⁽¹²⁾, considering the participants’ viewpoint. A review elaborated in 2009 found 21 papers that attempted to put in practice evidence through action-research⁽¹³⁾, positively assessing its effects on knowledge, professional performance, the structural context and patient outcomes. This review⁽¹³⁾ insisted that patient outcomes were the least explored in PAR literature.

In this paper, we show the assessment results of a global project⁽¹⁴⁾ to put in practice evidence at an onco-hematology unit of a Spanish hospital. Therefore, the following were proposed as the general aim – To assess the effectiveness of evidence implementation in CP through a PAR, in terms of professional performance and patient health outcomes; and as specific aims – To analyze differences in the assessment and control of signs and symptoms in both patient groups: pain, risk of pressure ulcer (PU), mucositis, nutritional status, nausea and vomiting; To analyze differences in the psycho-emotional area in both patient groups: anxiety, caregiver burden, adjustment of psychosocial impact and satisfaction with care; To analyze differences in adverse effects in both patient groups: venous catheter-related infection, venous catheter obstruction, PU, mucositis and pain level.

Methods

Design: A quasi-experimental, prospective design was used, with two non-equivalent and non-concurrent groups.

Study context: The study was developed at the isolation unit for onco-hematology patients of a tertiary-level public teaching hospital in Spain. This unit comprises eight beds for onco-hematology patients, with a mean stay of one month at the unit. The nurse/patient ratio is 1:3.

Study period: Data for the first patient group were collected in 2006. The intervention (evidence implementation through a PAR) took nine months in 2007, followed by a maturation period of the changes in CP. The second quantitative patient data collection phase took place in 2008.

Study participants: The eligible population included patients hospitalized at the unit, submitted to bone marrow transplantation or neutropenic patients who needed isolation or initial/relapse leukemia patients who needed hospitalization during the study period and complied with the following inclusion criteria: age > 18 years, stay at the unit > 3 days, intact cognitive skills and patients who signed the informed consent form. Deteriorated cognitive skills and participation in another clinical research were established as exclusion criteria.

Given that it was unknown how such a complex intervention would behave, with a very large number of dependent variables, that the estimated hospitalization rate was estimated at 70 patients for every time series and that the research team was able to include all hospitalized patients, the sample size was not calculated.

Data collection: The study variables were assessed across the patients’ hospital stay, using the records in the clinical history of hospitalization, either through the researchers’ direct evaluation and/or with the help of self-administered instruments (depending on the variable under analysis). To better capture the phenomenon, and depending on the nature of the variables, some were valued when the effects of chemotherapy and radiotherapy were at a height (severe neutropenia with minimum level of “absolute neutrophil count” (ANC<500)). For other variables, the measurement moment was set when improvement was visible (ANC>500). The following variables were collected in both patient groups:

1. Clinical and socio-demographic variables: Age, gender, medical diagnosis, days of stay, mortality, pharmacological treatments, albumin level and venous catheterization characteristics.

2. Professional performance (sign and symptom control):

- PU risk: the quality of records related to the evaluation of PU risk through the EMINA scale was evaluated before and after the intervention⁽¹⁵⁾;

- Mucositis evaluation: Pre- and post-intervention records were analyzed about the evaluation of the mucositis level, using the World Health Organization's (WHO) mucositis scale⁽¹⁶⁾;

- Nausea and vomiting: Pre- and post-intervention records were analyzed about the evaluation of nausea and vomiting.

- Pain assessment: Measured on the second day of ANC>500 through a Visual Analogue Scale (graded from 0 to 10 cm), asking the patient to globally indicate how (s)he would score the nursing staff's pain control. Similarly, pre and post-intervention records were analyzed about pain assessment.

- Nutritional assessment: The number of inter-consultations to the Nutrition Unit was analyzed before and after the intervention.

3. Patient health outcomes:

3.1 Psycho-emotional area

- Impact of psychosocial factors associated with hospitalization: Measured on the fourth day of ANC<500 and upon discharge from the unit, using the Psychosocial Adjustment to Illness Scale (PAIS)⁽¹⁷⁾.

- Anxiety: Trait anxiety was measured upon hospitalization, using the Spanish version of the STAI questionnaire⁽¹⁸⁾; state anxiety was measured on the fourth day of ANC<500 and upon discharge.

- Caregiver burden: Measured on the fourth day of ANC<500 and upon discharge from the unit, through the Spanish version of the Zarit caregiver burden Scale⁽¹⁹⁾ (on average, this type of patient is hospitalized for one month together with a caregiver).

- Satisfaction with nursing care: Measured on the fourth day of ANC<500 and upon discharge from the unit, using the Spanish short version of the La Monica-Oberst Patient Satisfaction (LOPSS12)⁽²⁰⁾.

3.2 Adverse effects:

- Pain level: Measured on the second day of ANC>500 through a Visual Analogue Scale (graded from 0 to 10 cm), asking the patient to globally indicate the pain suffered at the unit.

- Mucositis level: The maximum level of mucositis reached during hospitalized was collected through the WHO scale (graded from 0 to 4)⁽¹⁶⁾.

- Pressure ulcer: The incidence of PU was analyzed.

- Venous catheter related infection: The accumulated incidence of pericatheter infection, catheter-related bacteremia (CRB) and catheter colonization was analyzed in relation to the total number of catheters and total catheters-day.

- Venous catheter obstruction: The accumulated incidence of obstruction was analyzed in relation to the total number of catheters and total catheters-day.

Intervention under analysis: The intervention under analysis was a PAR⁽²¹⁾; the implemented evidence, whose effectiveness had already been demonstrated in CP⁽²²⁻²⁴⁾, is listed next and the entire process is schematically represented in Picture 1: a) Use of chlorhexidine as an antiseptic in central venous catheter handling and protocol update; b) Evaluation of nausea, mucositis, risk of pressure ulcer and pain, using validated instruments; c) Expert assessment of malnutrition risk; d) Music therapy administration; e) Use of cryotherapy together with the cytostatic agent 5-fluorouracil; f) Incorporation of patient preferences in decision making; g) Incorporation of help relation in patient care.

Data analysis: SPSS 15.0 statistical software was used for data analysis.

Descriptive: Descriptive analysis of both groups and calculation of central trend and dispersion measures according to each variable's distribution.

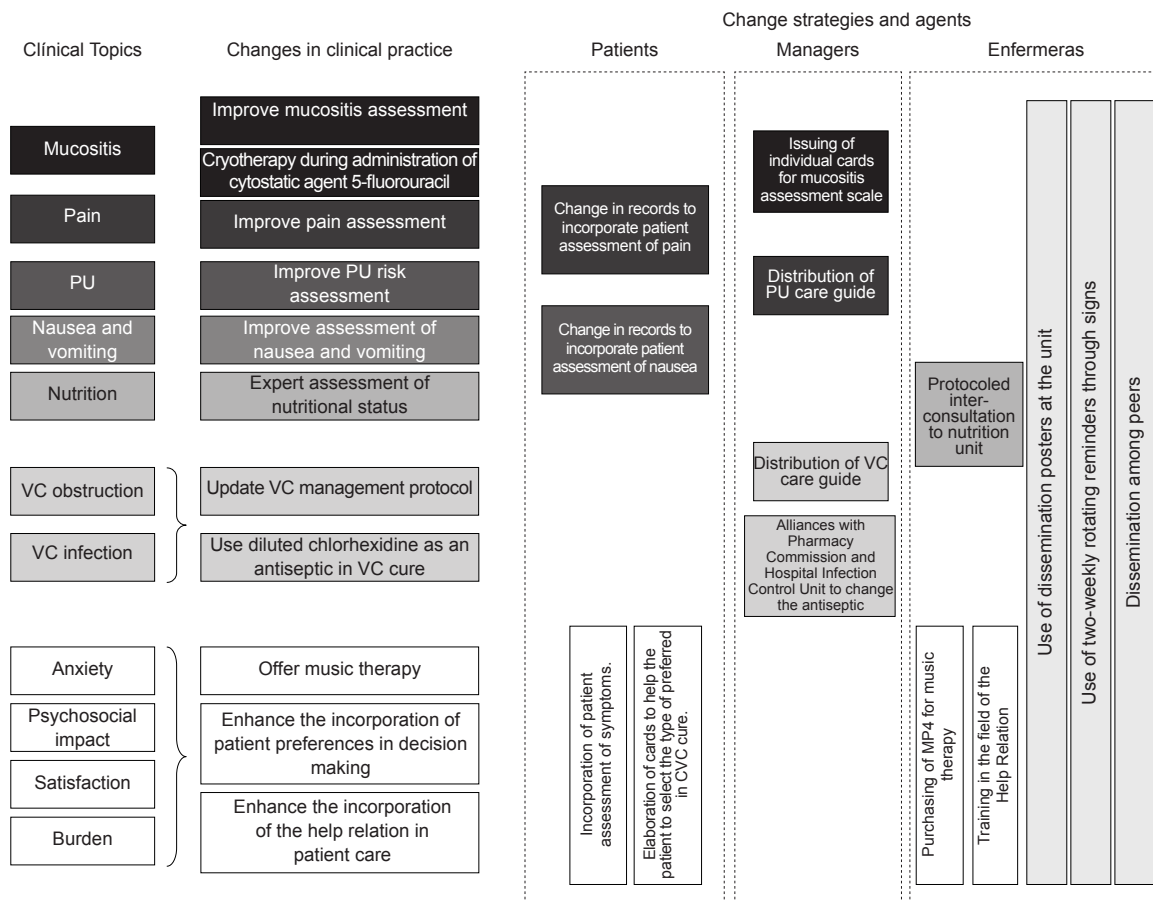


Figure 1 – Relation among clinical topics studied, changes, strategies and agents

Comparison between professional performance and patient health outcome variables in patients from each group: For the psychosocial adjustment, venous catheter-related infection and obstruction variables, effectiveness was analyzed and effect measures were calculated (absolute risk reduction with 95% confidence intervals): also, for the survival of the venous catheters, the Kaplan-Meier method was used; finally, for those variables with different measures along the hospital stay, intra-group changes were analyzed.

Quantitative variables: to compare means, Student's t-test or Mann-Whitney was used (depending on normal distribution or not) and ANOVA and Kruskal-Wallis. To compare means, the Wilcoxon and Kruskal-Wallis tests were used.

Qualitative variables: to compare these variables, chi-square and Fisher's exact test were used.

Ethical considerations: Approval for the project was obtained from the hospital's Clinical Research Ethics Committee and all participants took part voluntarily, after signing an Informed Consent Form. They were free to drop out of the study at any time and the confidentiality of their personal and family data was guaranteed.

Results

In total, 125 patients were included in both collection periods. In the pre-intervention group, 56 patients were recruited. Different losses occurred in the estimated patient inclusion: four patients were under age, six refused to participate, two dropped out and 12 patients were unexpectedly included in a commercial clinical trial. In the post-intervention group, 69 patients were included, while 11 could not be recruited: 1 patient refused to participate, data were lost for 2 patients and 8 dropped out.

Out of the 27 control variables studied, differences were found in 6 of them (medical diagnosis, neutropenia, days post-transplantation, immunosuppressive treatment, corticoids, opioids); despite these differences, we considered the groups were similar in terms of fundamental clinical variables.

The results concerning intervention effectiveness (Tables 1, 2 and 3) reveal that the introduction of evidence in CP through a PAR can strongly improve the results under analysis.

Professional performance: After the intervention, the quality of PU risk, pain and nausea and vomiting records clearly improved (Table 1). Patients' opinion regarding the evaluation of pain management by nursing

did not change though (8.3 ± 1.9 vs. 8.5 ± 2.1 ; $p: .426$). Similarly, in the second group, nutritional assessment improved, although not significantly (Table 1). The unit protocol indicated that, in the pre-intervention group, inter-consultations to the Nutrition unit should have taken place for at least 25 risk patients (according to the EMINA scale), but this was the case for only 10 patients (40%). On the opposite, in the post-intervention group, this happened for all identified risk patients.

Table 1 – Comparison of sign and symptom control

	Pre-intervention n=56	Post-intervention n=69	p-value [†]
Days without PU records	23.3±23.1*	8.6±10.5*	<.001
Pain records per patient	0	42.1±32.6*	<.001
Nausea records per patient	0	40.3±30.6*	<.001
Mucositis records per patient	0.1±0.4*	12.4±12.2*	<.001
Inter-consultation to Nutrition Unit	10 (17.9%)	15 (22.4%)	0.534

*Mean±Standard Deviation

†Statistical significance, p-value <0.05

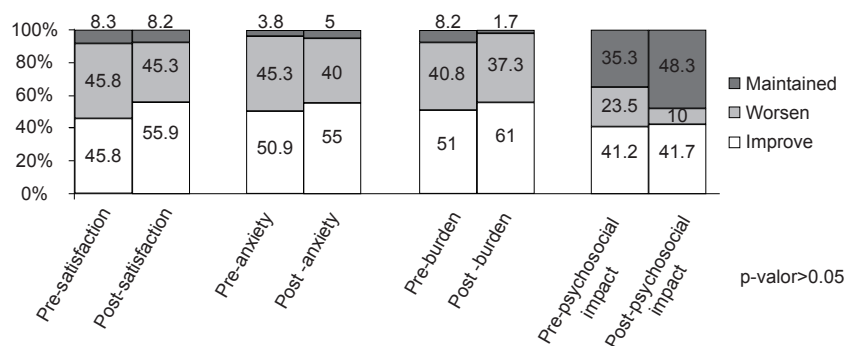


Figure 2 – Evolution in psychosocial variables during hospitalization

Anxiety data reveal a post-intervention group with greater anxiety as a personality trait (22.6 ± 10.5 vs. 26.3 ± 9.1 ; $p: .038$). This probably influences the fact that, in that group, when $ANC < 500$ and upon discharge, state anxiety levels are higher; the analysis of how this variable evolves along the hospitalization period,

however, reveals clearer improvements in this group after the intervention (9.7 ± 9.1 vs. 12.6 ± 7.1 ; $p: .083$).

Regarding intra-group changes, the analysis of psycho-emotional variables measured on different occasions reveals a significant improvement in caregiver burden in the intervention group (Table 2).

Table 2 – Differences between scores measured upon discharge and during the first assessment in the psycho-emotional area

		Pre-intervention n=56	Post-intervention n=69	p-value [†]
Anxiety	Score change [‡] among patients who get better	9.7±9.1*	12.6±7.1*	.083
	Score change [‡] among patients who get worse	6.5±4.5*	6.3±4.6*	.694
Psychosocial impact	Score change [‡] among patients who get better	3.5±2.5*	3.4±2.2*	.867
	Score change [‡] among patients who get worse	2.7±2.1*	3.5±2.5*	.494
Satisfaction	Score change [‡] among patients who get better	12.3±13.3*	10.7±11.8*	.730
	Score change [‡] among patients who get worse	8.3±11.9*	6.6±6.4*	.961
Caregiver burden	Score change [‡] among patients who get better	4.5±3.8*	6.5±5.6*	.045
	Score change [‡] among patients who get worse	6.6 ± 4.6*	5.4±4.4*	.310

* Mean ± Standard Deviation † Statistical significance, p-value <0.05 ‡ Score change between discharge and first measurement

Health outcomes for adverse effects: Each patient used various venous catheters and venous catheter characteristics (Table 3) show that both groups were comparable, despite more catheterization days for central venous catheters (CVC) and less for peripheral ones.

Although most patients in the post-intervention group used a CVC (accompanied by greater infection

risk), figures for this type of nosocomial infection (table 3) show statistically significant results in favor of that group (pericatheter infection, CRB and catheter colonization). If we group these three variables in a joint result, the absolute risk reduction amounted to 19.6% (95% CI 7.4-31.7; p: .001) for the post-intervention group.

Table 3 – Venous catheterization characteristics of patients and outcomes concerning venous catheter-related infection

		Pre-intervention n _{cat.} =72	Post-intervention n _{cat.} =87	p-value [†]
CVC		55 (76.4%)	76 (87.4%)	.071
CVC Type	Conventional	54 (75.0%)	83 (95.4%)	<.001
	Indwelling	18 (25.0%)	4 (4.6%)	
Location	Jugular	47 (65.3%)	54 (62.1%)	.533
	Subclavian	5 (6.9%)	7 (8.0%)	
	Peripheral CVC	3 (4.2%)	10 (11.5%)	
	Femoral	1 (1.4%)	2 (2.4%)	
	Others	16 (22.2%)	14 (16.1%)	
Catheter duration (days)	Catheter	22.0±13.3*	20.8±16.1*	.602
	CVC	27.1±10.9*	22.4±16.5*	.002
	Peripheral	5.5±2.4*	9.2±4.8*	.003
Infection	Pericatheter infection	13 (18.1%)	4 (4.6%)	.006
	Bacteremia	5 (6.9%)	1 (1.1%)	.136
	Catheter colonization	8 (11.1%)	1 (1.1%)	.012
Infection per 1000 catheters/day	Pericatheter infection	8.2	2.2	.025
	Bacteremia	3.2	0.6	.163
	Catheter colonization	5.1	0.6	.024

*Mean±Standard Deviation † Statistical significance, p-value < 0.05 Central venous catheter (CVC)

Catheter obstruction results show considerable improvement in the post-intervention group, with statistically significant differences for the absolute reduction of obstruction risk (21.4%; 95% CI 6.4-36.5; p: .003), incidence density (No. of obstructions/1000 catheter days: 29 vs. 14.4; p: .005) and longer dwelling time of catheters without obstruction, although not significant (16.3±9.9 vs. 18.1±11.7; p: .489).

Finally, no significant differences were found in the pain level felt (3.1±2.8 vs. 2.6±2.7; p: .448), nor in the level of mucositis (1.7±1.43 vs. 1.4±1.06; p: .157), nor in PU incidence (1.8% vs. 1.5%; p: 1.000).

Discussion

The project results reveal that the introduction of evidence in nursing practice through a PAR can improve certain health outcomes in onco-hematological patients, as well as the quality of their care processes.

Changes in CP represent highly complex problems, whose correct study demands different methodological perspectives⁽²⁵⁾; our research design achieved an

integrative attitude towards the project, as reality comprises not only data, but also facts, successes, situations etc.⁽²⁶⁾, which need to be taken into account to be able to successfully produce changes in CP.

Thus, in the post-intervention group, considerable improvement is found in the quality of sign and symptom assessment records (PU risk, pain, mucositis and nausea and vomiting), similar to other studies on the professional performance dimension⁽¹³⁾.

With regard to the psycho-emotional area, data do not reveal a clear trend, although important differences appear in some variables, such as the PAIS. The sensitivity of the instruments used to measure anxiety and caregiver burden may be low to detect changes. On the other hand, in our study, no change was found in patient satisfaction, as opposed to other studies that used PAR to put evidence in practice⁽¹³⁾. The instrument these authors used divides satisfaction into dimensions, obtaining significant differences for physical care and discharge planning; the instrument we used assesses satisfaction globally, and is less specific and more centered on the "affability" dimension.

As for the results related to the appearance of adverse effects, data show great improvement in the post-intervention group for those results related to venous catheterization. No differences appear in other adverse effects like the level of mucositis or PU incidence. Improvement in the latter did appear in other studies that used PAR to put in practice evidence in PU care at home⁽¹³⁾; in our study, the range of improvements in this outcome was very narrow, given the low baseline incidence levels among the onco-hematological patients in our series.

Finally, we may say that the intervention analyzed (the PAR) has been very useful to introduce evidence in complex contexts like health. The Promoting Action on Research Implementation in Health Services Framework also acknowledges this social context as crucial for the implementation of research results in CP⁽²⁷⁾, and more concretely in the nursing group⁽²⁸⁾. Likewise, the fact of combining strategies that enhance change and multifaceted interventions has facilitated the success of the intervention^(9,10), as well as the fact that the leaders were members of the research team⁽²⁹⁾. Moreover, as the stakeholders themselves produced the changes, this probably reduced resistance to change.

Despite the results obtained, possible study limitations should be taken into account: a) due to its non-randomized quasi-experimental design, sufficient control of confounding variables and other external and internal bias cannot be guaranteed; b) non-controlled researcher and patient expectations and their potential effects on outcome variables (as a control measure, the researchers responsible for statistical analysis did not know what group each patient belonged to); c) due to the qualitative nature of PAR, results cannot be generalized, but they can be extrapolated to similar situations or contexts; d) not all nurses at the unit may have carried out the change; e) possible problems in patient recruitment; f) some of the health outcomes studied are hardly sensitive to changes.

Conclusions

The implementation of evidence through a PAR process has improved many of the health outcomes studied and the quality (in terms of processes) of nursing care. Moreover, the PAR managed that the changes in CP were generated from the interior of the nursing group at the unit.

Future studies could use PAR to implement evidence in other contexts and analyze the maintenance of changes over time. Similarly, strategies should be

explored that join the potential of PAR with more solid quantitative designs than used in this research.

Acknowledgements

We are grateful for the work of the nurses who participated in the participating action research, for their dedication, enthusiasm and persistence.

Acknowledgements also to Carmen Lourdes Zárate Riscal, Amor Caravaca Hernández and Antonio Paredes Sidrach de Cardona for their cooperation with data collection.

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Received: Fev. 14th 2011Accepted: Jan. 6th 2012