WELL-BEING AND MEDICAL RECOVERY IN THE CRITICAL CARE UNIT : THE ROLE OF THE NURSE-PATIENT INTERACTION

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SUMMARY

In order to examine the effects of a nurse-patient inter-action-training program on the perceived well-being and medical recovery of patients in the Critical Care Unit of a second level care hospital, 18 nurses and 120 patients were randomly assigned to either an experimental or a waiting-list group. Training consisted of an intensive eight-week nurse training program which included reading materials, verbal instruction, modeling, role playing, and descriptive feedback (verbal and videotaped). The program sought to establish specific nurse behaviors such as visual contact, greeting the patient, offering help, physical proximity, praising, smiling, verbal requests, comforting touch, and avoiding criticizing, yelling/scolding and ignoring the patient. The effects of the program were measured in terms of patients' perceived well-being, pain, level of satisfaction with nurse care, and length of stay in the hospital, as well as instruction following, and approving or thanking nurse behavior. Behavioral recording involved videotaping nurse-patient interaction through a video camera and recorder controlled by an automatic motion detection device which could get activated at any time within the corresponding area. Medical recovery measures included the scales of the Acute Physiology Age Chronic Health Evaluation II (APACHE-II) assessment system, the Glasgow Coma Scale and caregiver estimates of apparent emotional state, independence from life-support equipment, reflexes, wound healing and general clinical stability. In order to assess inter-observer reliability, independent raters examined a random sample of at least one-hour of videotaped nurse-patient interaction in each eight-hour hospital shift. Reliability levels exceeded 80% for any given behavioral category or scale estimate. Results consistently indicated both clinical and statistically significant higher scores for the appropriate interaction and recovery measures of experimental participants as compared to those in the waiting-list condition. In view of several measures adopted to mitigate, against some alternative explanations of the results, and the practicality, low cost and effectiveness of the nurse-patient pro-gram, its use is recommended in the context of health care facilities and conditions in developing nations.

Key words: Hospital, recovery, cognitive-behavioral training, experimental, intensive, anxiety, health.

RESUMEN

Con objeto de examinar los efectos de un programa de entrenamiento en interacción enfermera-paciente sobre el bienestar percibido y la recuperación médica de pacientes hospitalizados en la unidad de cuidados intensivos de un hospital público de segundo nivel, 18 enfermeras y 120 pacientes se asignaron aleatoriamente a un grupo experimental o a uno control en lista de espera. El entrenamiento consistió en un curso intensivo de ocho semanas a las enfermeras, que incluyó materiales de lectura, instrucción verbal, modelamiento, ensayos conductuales y realimentación descriptiva (sobre videograbaciones). El programa buscó establecer, en las enfermeras, conductas específicas tales como hacer contacto visual, saludar al paciente, ofrecerle ayuda, tener proximidad física, elogiarlo, sonreirle, hacerle solicitudes verbales, darle contacto físico de apoyo y evitar criticar, regañar, gritar o ignorar al paciente. Los efectos del programa se midieron en términos del bienestar percibido, dolor, nivel de satisfacción con el cuidado de las enfermeras, además de días de estancia hospitalaria, seguimiento de instrucciones dadas por el personal de salud y expresiones de agradecimiento a las enfermeras. El registro conductual incluyó la videograbación de la interacción enfermera-paciente mediante un equipo activado por un sensor de movimiento, que se podía activar automáticamente en cualquier momento. Las medidas de recuperación médica incluyeron las escalas del sistema de valoración *Acute Physiology Age Chronic Health Evaluation II (APACHE-II)*, la Escala de Coma de Glasgow y estimaciones de los cuidadores sobre el estado emocional aparente, la independencia del equipo de apoyo vital, los reflejos, la cicatrización y la estabilidad clínica general. Con objeto de establecer la confiabilidad del registro, los obervadores independien-

tes asignaron puntajes a una muestra de por lo menos una hora de videograbación de la interacción enfermera-paciente, por cada ocho horas que conformaban los turnos del personal de enfermería. Los niveles de confiabilidad excedieron el 80% en cualquiera de las categorías conductuales o medidas escalares. Los resultados revelaron constantemente mayores puntajes clínica y estadísticamente significativos, de las medidas de interacción apropiada, bienestar percibido y recuperación médica de los participantes en las condiciones experimentales, en comparación con los controles en lista de espera. En vista de una serie de medidas adoptadas a fin de mitigar el efecto de algunas variables contaminantes que pudieran constituir explicaciones alternativas de los resultados, y del carácter práctico y económico del programa de interacción enfermera-paciente, se recomienda usarlo en el contexto de las condiciones de cuidado de la salud en los paises en vías de desarrollo.

Palabras clave: Hospital, recuperación, entrenamiento cognoscitivo, conductual, experimental, intensivo, ansiedad, salud.

INTRODUCTION

Epidemiological profiles of morbidity and mortality in Latin American countries in general and Mexico in particular continue showing a polarized status in terms of infectious and chronic-degenerative diseases. Main causes of death include heart disease, malignant tumors, diabetes, cerebral-vascular diseases, liver cirrhosis, and accidents, among others. On the other hand, however, infectious diseases still constitute an important cause of death among young children and the elderly, especially in low income strata (28, 29, 32).

In addition to the importance of both types of diseases as public health concerns, they bear two additional features which make them worthy of closer scrutiny by the behavioral sciences in general and health psychology in particular. On the one hand, they frequently lead to crises which imply extreme discomfort or pain and severe deterioration of the patients' quality of life. These patients tend to require highly specialized urgent attention provided in a hospital's Critical Care Unit (CCU). Physical and psychological disability, work absenteeism, sustained stress and emotional affliction are frequent additional components of these ailments. On the other hand, their intensive management frequently involves high cost interventions, equipment and materials as well as relatively long hospital stays. Patients hos-

pitalized in critical care units usually suffer life-threatening conditions which require around the clock observation and frequent interventions.

Although attention to the critical care unit patient encompasses the intervention of various health care professionals, it is probably the nursing personnel the one immediately responsible for the closest follow-up and daily supervision of the patients' recovery. In this regard, the nurses' participation in the health restoration process results is a key contribution to the effectiveness of medical treatment. Successive sets of nurses remain in frequent contact with the patient 24 hours daily, they comprise the largest proportion of health caregivers in hospitals' critical care units, and are responsible for directly incorporating most health care interventions on patients.

In addition to administering most medical decisions and interventions, nurses can provide additional assistance to patients in the form of interpersonal support and encouragement. Thus, nurses have the potential for implementing additional interventions, psychological in nature, aimed at effectively helping patients to cope with stress and increase their well-being, as well as accelerating health recovery. In fact, conspicuous absence of human support has been linked to slower recovery and poor patient quality of life in hospitals (24). Such poor recovery usually occurs through high levels of stress and anxiety or emotional reactions associated with excessive worrying and irrational fears. It may also occur through poor treatment compliance (17). Thus, it is only natural to assume that nurses trained to interact within well-calibrated interpersonal dimensions are likely to help hospitalized patients in critical care units. Another important aspect of improved medical recovery and patient well-being resides in the possibility of improved cost-benefit ratios of second and third level health care, derived from shorter hospital stays (18).

It is sometimes considered that changes along such dimensions are mere secondary additions to hospital health care. Some research studies in the last two decades have demonstrated otherwise. In fact, they have led to the development of such new areas as psycho-neuro-immunology. The environmental conditions prevailing in critical care units, added to the (usually acute) health problems shown by pa-

tients in such units are likely to become a prime opportunity to analyze the clinical effects (medical and psychological) of interventions aimed at improving patients' well-being. Paradoxically, very few research studies in the intersection of the medical, nursing and behavioral fields have analyzed such effects (6).

Among other activities, nurses detect changes suggesting significant deterioration or improvement in the health status of patients. Comments and indications by nursing personnel to other members of the health team frequently serve as feedback on care strategies.

One of the best structured approaches concerning nurse patient relations has been that by Hildegard Peplau (25). Its main purpose is to familiarize nurses with the cognitive, affective and instrumental aspects of a highly functional interaction. This approach emphasizes understanding the needs, feelings and attitudes of patients provided that such aspects adopt a two-way syntonic interaction based on trust (17). Optimum nurse-patient relations are said to progress through four stages: orientation, identification, exploitation and resolution. Although these steps are supposed to fulfill relatively specific identifiable functions they tend to overlap in everyday practice, depending on the needs of the patient (7).

Thus, if health is conceived as the capacity to function at the highest possible physical, psychological and social level, and nurses are expected to optimize the factors affecting health recovery (14), it is only natural to expect such factors to be a key component of health care (26, 36).

Experts in health care evaluation tend to agree on three basic quality components: a) technical care, b) interpersonal relations and c) the quality of the health care environment. Evaluation of such components should, in turn, allow for the evaluation of health care quality (11, 12). In Latin America, these assumptions have led to reconsider the role of interpersonal relations as part of quality standards for hospital care (2, 27). Interventions aimed at achieving these purposes are likely to be effective only to the extent that they stem from well-researched natural principles and mechanisms (30).

In the context of health care costs, the typical scarcity of resources in Latin American countries compels the search for better cost-benefit ratios. Several recent studies have shown that professional nurses with varying degrees of specialized training may indeed impact on health care in terms of improved quality and cost-benefit ratios (3, 15, 31, 33). In this regard, a widely used measure of hospital health care quality involves the opinion of patients. Some recent studies which have made notable contributions to this type of research include those using objective definitions of quality, as well as expectations and predictors of patient behavior (23, 35).

Other studies have estimated patients' expectations regarding nursing personnel, including satisfaction with such variables as restfulness, relaxation, food quality, personal hygiene, personal support, reaction to treatment and quality of contact with nurses (1). Still other measures have included such aspects of interpersonal quality as: communication, friendliness, courtesy, interest, kindness, personal tone and humor, and cheerfulness (10). On the basis of these and other studies, eight basic components of patient satisfaction have been identified: clinical competence, accessibility, comfort, physical environment, patients' socio-economic status, care disposition, care continuity and treatment effectiveness.

In terms of the actual effects of nurse behavior on patient satisfaction and health status improvement at the critical care unit, some recent studies have shown promising results. One showed that improved nurse-patient interaction significantly decreased the type of extreme anxiety associated with psychological immobility and numbness of patients under prolonged assisted breathing (5, 19). Also within this line of research, results by Vason (34) revealed that interpersonal contact aimed at reducing excessive sensory stimulation in a post-surgical recovery area decreased hypertension, sleep disorders, and perceived stress. Finally, in a study including two hundred patients recovering from liver-transplant surgery, improved nurse-patient interaction led to significant reductions in length of stay, in-hospital infections and costs, while increasing patient satisfaction (20).

These results provide some solid background and context to similar findings, but few studies include detectable fluctuations in nurse-patient interaction, as well as more reliable measures of well-being and other recovery indicators. Additional methodological precautions would allow for a clearer link between

nurse-patient interaction and health recovery.

In order to examine the effectiveness of a training intervention on specialized (critical care) nurses and its repercussion on the well-being and medical recovery of the patients receiving their care, the present study conducted a series of comparative controlled experiences. An additional purpose was to determine the applicability and practicality of the interventions under the typical conditions prevalent in public hospitals in countries with social, economical and cultural characteristics similar to those of Mexico.

METHOD

Participants
Nurses
A total of 18 nurses of the critical care unit at the "Zone 2 hospital" of the Mexican Institute of Social Security in the capital city of the state of San Luis Potosi participated in the study. All were specialized nurses with formal training in critical care and worked in one of the three usual shifts of hospital personnel: morning, afternoon and night.

From the CCU nursing personnel roster including all shifts, nine were assigned to an experimental condition and nine to a waiting list (control) condition. They were asked to participate in the study through an informed consent letter which all agreed to sign. All were women with the modal ages in the 30 to 35 years range, most were married and had between 10 and 15 years of general nursing practice with 5 to 7 years of professional experience in critical care units. Both groups had attended one single continuing education course in the last six months and none had attended conferences or conventions in the last 12 months. Also, none of the participants had attended the weekly clinical sessions routinely attended by physicians in which patient cases were reviewed.

Patients
Patients participating in the present study were sent by any of the hospital services or admitted to the emergency room. Participants included 120 patients, 60 randomly assigned to an experimental condition and 60 to a waiting list group in terms of being cared by the nurses described above, who were either trained immediately or in a deferred fashion.

Inclusion criteria
Patients were admitted to the research protocol if their medical condition included the following three criteria:
1. Seriously ill patients with good recovery potential, requiring assisted breathing, constant specialized surveillance and assistance.
2. Patients suffering from intermediate (serious) conditions who required additional assistance for recovery.
3. Patients recovering from major surgical procedures.

In order to achieve a reasonable level of objectivity concerning the inclusion criteria, the nursing/medical team administered the "Acute, Physiology, Age, Chronic Health Evaluation II" (APACHE II). This set of procedures is designed to evaluate the seriousness of a disease (21, 22). The system takes three main parameters: age, a set of 12 physiological variables and the health status prior to admission. Once the system generates a score, it classifies the severity of the condition by combining the three parameters. For the present study patients with an "APACHE-II" score of 27, referred to the critical care unit along a period of 18 months were selected for participation. This score assumes a 50-50 chance of survival and recovery. Thus the sampling procedure of the study was intentional, producing a homogeneous participant pool.

Exclusion criteria
Due to the reduced reactivity of patients and highly invasive care procedures imposed by some conditions, patients were not assigned to the study if they:
1. Were recovering from coronary bypass surgery.
2. Were originally admitted to the CCU as a direct consequence of cardio-respiratory arrest.
3. Suffered third degree burns.
4. Were not completing a minimum of 24 hours of stay at the CCU.
5. Had not completed the total set of "APACHE-II" assessment procedures.
6. Had medical/nursing diagnoses leading to uncertainty regarding the severity of their condition, or coursing an agony/terminal phase.

The actual principal conditions at admission for the patients included (in non-exclusive categories): chest pains (28%), shortness of breath (13%), abdominal pain (15%), crime/accident-related wounds (15%), polyuria/polydypsia

(8%), digestive tube bleeding (6%), loss of consciousness (6%), intense headache (5%), other types of pain (5%), electric shock (3%), second degree burns (2%), and other conditions (8%).

The most frequent diagnoses made on arrival included myocardial infarction and conditions requiring exploratory laparoscopy. Most had had one or two previous hospital admissions, with at least one requiring surgery. Upon admission, all patients were also administered the Glasgow Coma Scale. The expression capability of most patients was very similar, around the 9-11 (intermediate) range, in terms of responsiveness to verbal stimuli and reactivity to health team directions. In nearly all cases, the initial medical assessment at the CCU led to specialized attention by the services of internal medicine, cardiology and surgery.

In terms of patient socio-demographics, the percentage (in parentheses) distribution by bracket included Age: 31-40 (25%), 41-50 (25%), 51-60 (20%), > 61 (15%). Gender: Male (53%), Female (47%). Most patients were married, had six years of formal education, and owned the places they lived in. In most cases, such facilities included running water, drainage, electricity, bathroom and telephone. The modal frequency of monthly family income was around two times the minimum wage (approximately 300 US dollars). Regarding some health-relevant indicators, their daily diet was judged (by hospital dietitians) as inadequate and/or insufficient. Most reported taking showers every other day and washing their hands before eating or cooking.

Apparatus and materials
The study's recording and training activities were supported by a TV camera, two video-recorders, a 21-inch color video monitor, videocassettes, manual chronometers, writing materials and specially designed recording sheets.

Measurement
In addition to the regular recording of the Glasgow Coma Scale and the APACHE-II systems, a behavioral observation-recording system was designed to measure nurse-patient interaction indicators. It included behavioral categories involving positive and negative interaction indicators by nurses and patients. In all cases interaction was defined as the occur-rence of behaviors belonging to a specific category during the observation intervals. All positive behaviors were expected to occur in the immediate physical proximity of the patient or his/her bed while lying on it. Observers entered the appropriate code in the corresponding interval segment of the recording sheet. Patient-recovery recording sheets included degree of consciousness, pain, reflexes, wound healing, clinical stability, apparent emotional status, and estimated interest to engage in activities.

A video camera was unobtrusively installed in the appropriate area of the CCU, on the wall, by the head side between two beds. The camera was connected to a video recorder and a motion-activated sensor which started the system's recording mode. The camera's scope included two beds and could be activated at any time, day or night.

Coding and recording from the videotapes was transferred to a printed sheet for noting down the occurrence of the corresponding categories. Recording sheets contained cells to include 30 intervals of 30 seconds of observation each and a coding guide. Total recording by category included 24 time periods of 15 minutes each. Thus occurrence frequency included a total of 360 minutes for all categories.

Four specially trained certified nurses with a minimum clinical experience of one year prior to the beginning of the study acted as coders and observers. Two were the main observers for the study and two assisted in recording reliability periods and analyzing data from the videotapes.

Observer training included four sessions, each for each component of the recording system as follows: a) manual reading and mastery of behavioral categories, b) an oral exam including recording procedures and categories, c) two three-hour sessions of actual on-the-setting supervised recording (where the trainer provided descriptive feedback), and d) reliability computing. Once a trainee achieved a reliability criterion of 90% independent agreement for occurrence and 75% for non-occurrence, he/she was formally assigned recording tasks.

Once initial baseline recordings for both patients and nurses were completed across the three hospital working shifts, the successive training segments were instrumented for the

corresponding nurses one shift at a time starting with the morning shift.

Nurses positive interaction behavioral categories

Sharing: Facing the patient, the nurse offers him/her such items as a glass of water, prescribed food, special urinals, the patient's audio cassette player or transistor radio, or some other object used to support the patient's well-being or treatment.

Praising: Verbal comments involving approval, recognition or praise to the patient, such as "that was very well done", "you look much better today", and "you are recovering real fast". All comments had to involve clear, audible and a kind tone of voice, and may or may not involve such physical contact as patting the patient's feet, arms, hands or shoulders.

Visual contact: The nurse looks the patient in the eyes for as long as the nurse is at the patient's bedside (unless engaged in incompatible technical procedures), regardless of whether the patient is looking at her/him.

Brief contacts: The nurse stands at a distance no longer than an arm's length from the patient, for a period no shorter than five seconds.

Proximity: As in the previous category but involving contacts longer than five seconds.

Physical contact: The nurse touches, pats or hugs the patient.

Verbal requests: Include clearly audible verbalizations expressing a request, a suggestion or announcement by the nurse. Some examples include "(patient's name), please open your mouth", "please lift your arm", "please turn on your side so that I can raise your headrest", "you are going to feel a mild sting but it will hurt very little", "we are going to give you your sponge bath".

Smiling: Lifting the lips corners while looking the patient in the eyes.

Modeling: Body changes or movements accompanied by the corresponding descriptive verbalization, reproduced by the patient within the following ten seconds ("Please cough like this", "lift you tongue like this").

Laughing: Lifting the lips corners or congruently opening the mouth while emitting the characteristic voiced laughter sound, with or without an appropriate comment such as "that was funny Mrs/Mr... (patient's name)".

Nurses negative interaction behavioral categories

Disapproving: Verbalizations implicating disagreement, negation, disgust or criticism of the patient. Examples: "No, not like that", "I've already told you how to turn around".

Yelling: Loud verbalizations or utterances containing comments, criticism or disapproval of the patient. Examples: "Hey, that was really bad!", "Don't get out of bed!", "Don't remove that bandage!".

Ignoring the patient: After a question or verbal request by the patient, the nurse does not answer verbally within five seconds in a congruent manner, or does not perform the requested action or does not give an explanation of why it cannot be done, or simply nods (yes or not), without establishing distinct visual contact with the patient.

Patient positive interaction behavioral categories

Acceptance: After the nurse offers or performs a health related or comfort providing function the patient says "yes", "mmhm", thanks the nurse, nods affirmatively with the head, eyes or hand, expressing agreement, acceptance or satisfaction.

Instruction following: Engaging a behavior (within the patient's actual capabilities) in response to an appropriate request or instruction by the nurse, within five seconds of the request. Examples: posture changes, answering questions.

Visual contact: Same definition as the category for nurses.

Physical contact: Same definition as the category for nurses.

Requests: Includes verbal, digital or manual indications (in case of verbal impossibility) expressing a need or request, followed by the corresponding nurse appropriate behavior. Examples: requesting a glass of water, pain medication, etc.

Smiling: Same definition as the category for nurses.

Maintaining attention: The patient keeps sustained eye contact while the nurse provides an explanation, information, instruction or appropriate comment.

Laughing: Same definition as the category for nurses.

Praise: A verbalization or clearly distinguishable gesture expressing gratefulness or approval of an action by the nurse.

Patient negative interaction categories

Disagreement (negativity): Verbalizations expressing opposition to nurse's actions. Ex-

amples: "I don't want that medicine", "don't move me", "don't touch me", "I don't want to eat", "leave me alone".

Yelling: Same definition as the category for nurses in the absence of a justifying situation such as acute pain, extreme discomfort or other urgent need.

Ignoring: Same definition as the category for nurses in absence of a justifying situation such as being asleep or unconscious.

Reliability
Inter-observer reliability was assessed by comparing the recordings of two observers on randomly selected portions of every video session. Reliability raters were two specially trained nurses, separated by a wall partition, which observed and recorded the appropriate videotape segment. Three types of reliability were obtained: occurrence, non-occurrence and total reliability (16) through the use of the following formulas.

Total: Agreements divided by agreements plus disagreements, multiplied by 100.

Occurrence: Occurrences divided by occurrences plus non-occurrences, multiplied by 100.

Non-occurrence: Non-occurrences divided by non-occurrences plus occurrences, multiplied by 100.

Total nurse performance reliability for both baseline and treatment (control-experimental) conditions ranged between 93% and 99%. Experimental participants' baseline occurrence reliability ranged from 73% to 86%. Treatment condition reliability ranged from 73% to 82%. Reliability of control participants (baseline only) ranged from 74% to 86%.

Patients' total reliability ranged from 95% to 98% in both experimental and control conditions. Occurrence reliability of experimental

TABLE 1
Mean rank behavior changes of nurses in relation to treatment

Behaviors	Control	Exp.	p
Sharing	3.58	9.46	.0038
Praising	3.76	9.29	.0028
Visual Contact	3.72	9.44	.0037
Proximity	3.69	9.41	.0036
Physical Contact	3.72	9.19	.0034
Requests	3.81	9.16	.0035
Smiling	3.24	9.03	.0020
Modeling	4.61	9.18	.0031
Laughing	3.33	9.01	.0021
Disapproving	8.50	3.00	.0022
Ignoring	8.08	3.00	.0038

TABLE 2
Mean rank behavior changes in patients in relation to treatment

Behaviors	Control	Exp.	p
Acceptance	3.81	9.16	.0034
Praising	3.56	9.01	.0027
Visual Ct.	3.33	9.48	.0037
Physical Ct.	3.21	9.40	.0027
Requests	3.98	9.06	.0031
Smiling	4.65	9.26	.0026
Instruct F.	4.71	9.44	.0039
Laughing	3.29	8.99	.0027
Disapproving	9.50	3.50	.0021
Ignoring	8.50	3.00	.0022

participants in baseline ranged from 77% to 90% during baseline, and from 65% to 81% during treatment. Control patients' reliability ranged from 80% to 90%.

Design
The comparisons of the study involved a multiple baseline design across groups (4). Both patients and nurses of each of the three shifts of the hospital's CCU comprised each group. Recording involved six sessions for the morning shift comprising a total of 144 hours, twelve sessions for the afternoon shift (288 hours) and 18 sessions for the night shift (432 hours). The difference in the number of sessions reflects the stepwise delay component of the multiple baseline design for each successive shift. Thirty-second intervals comprised each observation session.

Procedure
Nurse training involved six sessions which included readings, discussion and analysis of specific technical (nursing) and behavioral procedures and observation criteria, written and verbal instructions, modeling, role playing, and descriptive feedback by instructors on either videotaped segments or recording materials. Training activities took place at either a room

TABLE 3
Patients mean physiological-reactivity recovery in relation to treatment (all associated p <.002)

Parameter	Exp.	Control
Glasgow Coma Scale	5.00	4.25
Apparent emotional state	3.00	3.90
Reflexes	3.00	3.30
Independence from:		
I.V. fluids	6.00	3.00
Catheters	6.00	4.00
Probes	3.70	6.00
Infusion pumps	6.00	3.80
Draining	6.00	3.70
Cardiac monitoring	6.00	2.00
Assisted breathing	6.00	2.70

TABLE 4
APACHE-II Patient frequency and percentage distribution at admission and discharge in relation to treatment (all associated comparisons Chi-square p<0.01 at discharge)

Condition severity	At admission				At discharge			
	f	% (Exp.)	f	% (Control)	f	% (Exp.)	f	%(Control)
35 < points	3	5	3	5	-	-	3	5
30 - 34	-	-	-	-	-	-	-	-
25 - 29	3	5	3	5	-	-	-	-
20 - 24	9	15	6	10	-	-	-	-
15 - 19	48	80	51	85	-	-	-	-
10 - 14	-	-	-	-	-	-	4	7
5 - 9	-	-	-	-	-	-	11	18
0 - 4	-	-	-	-	60	100	42	70

with the video equipment or the actual work site (CCU) with patients. Training was considered complete when nurses achieved 90% of appropriate procedural/behavioral performance. Total training encompassed a total of approximately 145 hours. Control nurses were assigned to an adjacent area, opposite the experimental treatment area. The facilities' physical features made unauthorized communication between nurses belonging to the two groups very difficult.

RESULTS

Data collected prior to the nurse training intervention were collapsed in order to convey a general sense of nurse and patient functioning prior to the treatment, and are labeled "control" or "before" throughout this section. Similarly, data collected once the intervention (nurse training) was completed are labeled "experimental" or "after". In order to explore any initial differences among nurses or patients to be assigned to either treatment or control conditions, a Mann-Whitney U test was computed to data from their corresponding behavioral codes. This test was chosen provided the ordinal nature of most measurement scales used

TABLE 5
Mean rank patient satisfaction on nurses performance at time of discharge (lower scores denote less satisfaction, all p<.000)

Area	Exp.	Control
Individualized attention	2.50	1.00
Helpfulness	1.90	1.00
Information providing	2.25	1.05
Courtesy	2.10	1.00
Understandable explaining	2.65	1.00
Compassion	2.10	1.00
Punctual/opportune help	2.00	1.00
Frequency of assessment	2.25	1.00
Accessible object placement	1.95	1.00
Nurse care as recovery factor	1.60	1.00
Concern	2.10	1.00

in the present study and the basic assumption that the underlying variables on which the two groups (experimental and control) were compared and continuously distributed (9). The computer program assigns a rank order to each measurement for each variable, and computes the associated probability in terms of the differences between the data from the two samples (conditions). No initial significant differences were found in any behavioral category.

Table 1 shows the mean rank values of nurse performance before and after training for both positive and negative behavioral categories. The third column shows the probability associated to the size of the difference, ranging from p=0.020 to p=0.038. All but one (brief approaches) positive behaviors increased and all negative behaviors decreased after training.

Table 2 shows the mean rank values in patients comparing before (control) and after (experimental) performance in both positive and negative behavioral categories. As is the case for nurse behaviors, all positive patient behaviors increased and all negative behaviors decreased with change values associated to a probability (significance alpha) ranging from p=0.021 to p=0.039.

Table 3 shows recovery data along medical parameters from patients whose nurses had received the specialized training (Exp.), compared to those who had not (Control). Data include Student t scores on the means of physiological and reactivity parameters on both the Glasgow Coma Scale and other physiological independence measures. Except for the scales on apparent emotional state, reflexes and the use of probes, higher values represent less need for support materials and equipment. Statistical significance of pre- to post-treatment differences ranged from p<0.002 to p<0.0001.

Table 4 shows the comparative frequency

and percentage data for APACHE-II values of patients at time of admission into the CCU and at discharge. Higher values in these scales denote more severity of the medical condition. Columns under the "At admission" heading include initial data from patients whose nurses would later receive the treatment (Exp.) and those who would not (Control). The statistical comparison between these two sets of data yielded non-significant Chi-Square differences at admission. Data under the "At discharge" heading contain the differences between patients of nurses exposed to the treatment (Exp.) and those who did not (Control). Frequency differences at discharge showed statistical significance beyond the $p<0.01$-associated probability value. Table cells containing dashes denote no patients falling in the corresponding APACHE-II condition severity-point intervals.

Table 5 shows the mean rank scores of patient satisfaction along the ten categories defined for the opinion/subjective assessment of patients of their respective nurses' performance during the patients stay at the CCU. Data for trained nurses (Experimental) and non-trained nurses (Control) showed Mann-Whitney U test differences associated to probabilities beyond $p=0.0009$.

The largest differences occurred for the categories related to: understandability of explanations to patients (on procedures, health status, etc.); individualized attention to each patient, and amount of information given to patients. The smallest (although still significant) differences occurred in the categories referring to nurse care as direct health recovery factor and personal helpfulness.

Finally, additional data on patients perceived pain, general interest and ability to engage in activities also showed significant improvement as compared from non-treatment to treatment conditions ($p<0.002$). Similarly, the modal percentage of days of stay at the hospital for experimental patients was 23% for the three days value, in contrast to 58% of control patients who stayed for an eight-day modal frequency. Student T test analysis on the total mean of days per conditions yielded a value with an associated probability of $p<0.002$ in favor of the experimental condition data.

DISCUSSION

The purpose of the present study was to examine the effects of improving nurse-patient interaction on the medical and psychological recovery of patients hospitalized in a critical care unit. The study's findings showed clinically and statistically significant improvement of patient recovery and well-being on the basis of an intervention consisting of specialized nurse training. Scores in both instruments and observed behavioral categories designed to assess well-being and improvement along medical and psychological dimensions increased only after the intervention was put into effect. Differences could hardly be explained by time passage, general interactive habits by the health team, socio-demographic features of either patients or nurses or previous patient hospitalizations.

In terms of behavioral changes and psychological well-being, measures related to quality of interpersonal interaction appeared clearly linked to the treatment (nurse training). Expressions by patients and additional measures of medical conditions showed no significant differences prior to treatment, but were noticeable differences afterwards. On admission, patients were also similar concerning other variables such as previous number of hospitalizations, general diagnosis on arrival, APACHE-II and interpersonal interaction scores. In contrast, measures after treatment showed marked improvement apparently related to the intervention package for nurses.

Regarding medical recovery, nearly all the physiological parameters as well as clinical and laboratory data reflected both improvement and stability as an effect of the intervention, in contrast to those of patients whose nurses were not exposed to it. The actual number of hospital stay days also reflected effects seemingly related to the intervention, showing a cumulative total of 212 days for patients under the treatment condition as compared to 419 for patients under the control condition. Although a specific analysis of actual hospital costs would be beyond the scope of the present study, it seems only natural to assume that the intervention actually helped reduce hospital expenditures.

An interesting feature of the rate at which the behavioral effects became part of the nurses' permanent daily activities was their

gradual increase. After the initial training, systematic feedback along several on-site sessions still produced improved nurse performance. This seems to imply that sustained appropriate interaction patterns are not common in everyday nurse-patient work. This would make additional training along specific interpersonal standards a desirable goal for health care systems.

The present findings also suggest the need for a systematic addition of interpersonal training to both nurse education curricula and continuing education programs.

Concerning patients opinion, data showed increased values toward normalcy and satisfaction with the various features of the nurse-patient relationship associated to the treatment. Patients were more alert, relaxed, depended less on brief-usage prosthetic devices or life support systems.

The findings of the present study confirm and extend previous ones in the sense of showing that an improved nurse-patient interaction contributes to both psychological and medical recovery. Effects may well operate through such processes as improving interpersonal competence, reducing stress and anxiety, providing comfort and support, and promoting therapeutic adherence, among others. The effects of these processes have been proposed by several researchers in relation to other instances of health recovery (13). In addition, these results replicate other findings which suggest that improved nurse-patient interaction contribute to reduce the number of stay days, infections in surgical incisions, levels of stress and anxiety, as well as costs (1, 3, 5, 10, 15, 19, 20, 31, 33, 34).

The present results also suggest that nurses trained in interpersonal skills tend to be more effective in terms of clinical competence than untrained ones.

Additional informal comments and opinions by both medical personnel and hospital authorities at the end of the study consistently pointed out that the trained nurses were more in contact with the patients needs, detected both physiological and psychological problems earlier, had better communication with physicians leading to improved joint interventions and increased the time physicians actually spent inside the CCU. Further informal comments by hospital officers suggested that dissemination of the procedures to the hospital

medical personnel could also lead to improved physician-patient interaction and medical efficiency.

Participating nurses informally pointed out that they felt more efficient, useful and in better contact with their patients as a result of the intervention. They also said training helped them cope better with the stress associated to staffing the CCU, provided better support to their patients and their family members, were more competent clinically, developed better human relations with the health team and felt better professionals.

Although there is always an open possibility of both methodological errors and improvement, several features of the present study were put into effect to help mitigate some alternative explanations of the main findings.

Behavioral and psychometric reliability was high, nurses and observers were kept experimentally naïve as to any changes expected from the procedures, and automatic recording allowed for repeated assessment of behavioral data. Also, the design (as well as specific precautions) helped isolate the effects of the experimental intervention from other possible confoundings such as time passage or unauthorized communication between participants under different conditions.

Further attempts to explore this line of research could include the analysis of long term maintenance, generalization and collateral effects of improved nurse-patient interaction.

Additional analyses might also involve examining the potential effect of adding physicians to an interactive triad and, in fact, extending the analysis of possible effects to other service areas of hospital care. Such analyses and their respective findings are likely to help improve hospital care especially in a context of chronically scarce resources and occasionally run down facilities and equipment frequently found in Latin American public hospitals.

Health care in countries with these characteristics is very likely to benefit from the systematic implementation of interventions based on sound behavioral research.

Other policies likely to contribute to long-term improvement of health care include the systematic addition of courses related to both research and implementation on issues such as those covered by the present paper, to nursing and medical basic curricula. Another strategy includes providing a sensible place for

health psychologists in health care facilities and institutions.

REFERENCES

1. ABDELLAH F, LEVINE E: Developing a measure of patient and personal satisfaction with nursing care. *Nurses*, (5):100-108, 1993.
2. AGUIRRE GH: Evaluación de la calidad de la atención médica. Revista Instituto Nacional Salud Pública, (8):70-98, 1990.
3. ANDERSON EF: *Community as Client: Applications of the Nursing Process.* University of Pennsylvania Press. Philadelphia, 1993.
4. BAER DM, WOLF MM, RISLEY TR: Some current dimensions of applied behavior analysis. *J Appl Behav Anal*, 1(1):91-97, 1968.
5. BALLARD K: Identification of enviromental stressors for patients in a surgical intensive care unit. *Issues Mental Health Nursing*, (3):89-108, 1993.
6. BAUM A, NEWMAN S, WEINMAN J, WEST R, MCMANUS C: *Cambridge Handbook of Psychology, Health and Medicine.* Cambridge University Press. Cambridge, 1997.
7. BEARD M, JOHNSON MN: Nurse theorists approaches in mental health. *Psychiatric Nursing*, 71-86, 1993.
8. COHEN F: Personality, stress and the development of physical illness. In: *Health Psychology: A Handobook.* Cohen F, Adler NE (eds.), 77-111 Josey Bass, San Francisco, 1982.
9. CURTIS DA, MARASCUILO LA: Point estimates and confidence intervals for the parameters of the two-sample and matched-pair combined tests for ranks and normal scores. *J Exp Edu*, 60(3):243-269, 1992.
10. DOLL A: The things patients say about their nurses. *Nurs*, (5):113-120, 1979.
11. DONAVEDIAN A: La dimensión internacional de la evaluación y garantía de calidad. Conferencia: Internacional symposium "Perspectivas mundiales sobre la salud". *Boletín Instituto Nacional Salud Pública*, 10:70-85, 1990a.
12. DONAVEDIAN A: *The Definition of Quality and Approaches to its Assessment.* Health Administration Press. Ann Arbor, 1990b.
13. FORCHUCK C: The orientation phase of the nurse-client relationship: Testing Peplau's theory. *J Adv Nurs*, 20(3):532-537, 1994.
14. GILLISS CL: Reducing family stress during/after coronary artery bypass surgery. *Nurs Clin North Am*, 19:103-112, 1993.
15. GUALDA DM: Eu conheco minha natureza: Um estudio etnografico de vivencia do parto: Universidad de Sao Paulo. *Revista Escuela Enfermería*, 2:24-40, 1993.
16. HARRIS FC, LAHEY BB: A method for combining occurrence and nonocurrence interobserver agreements scores. *J Appl Behav Anal*, 11(4):523-527, 1978.
17. HORVATH AO: The therapeutic relationship: From transference to alliance. *J Clin Psychol,* 56(2):163-173, 2000.
18. JACOBS DF: Cost-effectiveness of specialized psychological programs for reducing hospital stays and outpatient visits. *J Clin Psychol*, 43(6):729-735, 1987.
19. JOHNSON M, SEXTON D: Distress during mechanical ventilation: Patients' perceptions. *Crit Care Nurs*, 19:48-57, 1994.
20. JOYCE A et al.: Role of the nurse in the multidisciplinary team approach to care of liver transplant patients. *Mayo Clin Proc*, 64:648-698, 1994.
21. KNAUS WA: APACHE II. A severity of disease classification system. *Crit Care Med*, 13:818-829, 1991.
22. KNAUS WA: APACHE II. Prognostic system, risk prediction of the hospital mortality for critically ill hospitalized adults. *Chest*, 100:1619-1636, 1993.
23. MCDANIEL C, NASH J: Compendium of instruments measuring patient satisfaction with nursing care. *Qual Rev Bull*, 16(5):182-188, 1994.
24. MINICK P: The power of human caring: Early recognition of patient problems. *Sch Inq Nurs Pract*, 9(4):303-317, 1995.
25. PEPLAU HE: A conceptual frame of reference for psychodynamic nursing. In: *Interpersonal Relations in Nursing.* MacMillan, New York, 1988.
26. REDLAND SH: Differences in recovery from cardial surgery. *Heart Lung*, 19:481-495, 1993.
27. RUIZ DE CHAVEZ M et al.: Bases para la evaluación de la calidad de la atención en las unidades médicas del sector salud. *Boletín Instituto Nacional Salud Pública*, 13:116-132, 1991.
28. SANCHEZ-SOSA JJ: Psychology and primary prevention in public health: Some implications for developing nations and a progress report. In: *Health and Clinical Psychology*, Sanchez-Sosa JJ (ed.), pp. 403-414, Elsevier Science Publishers, Amsterdam, 1985.
29. SANCHEZ-SOSA JJ: Comportamiento humano y salud: El papel de la psicología en la atención de problemas básicos de prevención, tratamiento y prospectiva de la salud en México. *Higiene*, 39:17-20, 1989.
30. SANCHEZ-SOSA JJ, HERNANDEZ-GUZMAN L: Investigación básica y derivación tecnológica en el análisis de la conducta: El difícil pero esencial tránsito del laboratorio a la práctica profesional. *Psicología Iberoamericana*, 4(2):61-67, 1996.
31. SHERER JL: Health care reform: Nursing´s vision of change. *Hosp*, 67(8):20-26, 1993.
32. SSA (Secretaría de Salud): *Estadísticas Vitales en Salud: Diez Principales causas de Morbi-mortalidad en México.* México, 1992.
33. TEBBIT BU: Strategic planning in nursing.. In: *Strategic planning.* Stall MK, Pikerton SE (eds.) Aspen Publishers, Gaithersburg, 41-50, 1994.
34. VASON R: Stress effects on patients in critical care units from procedures performed in others. *Heart Lung*, 9:494-499, 1993.
35. VUORI H: Patients satisfaction: An attitude or indicator of the quality of care? *Qual Rev Bull*, 13(3):106-108, 1993.
36. WANG SH: Patient medication: A review of the issues. *Med Care*, 28(11):1089-1103, 1993.