

# Effects of the Neuro-Linguistic Programing Technique Used in the Education Given to Nurses About Central Venous Applications and Blood Culture Collection on Their Knowledge Level

## Santral Venöz Kateter Uygulamaları ve Kan Kültürü Alınması Konusunda Hemşirelere Verilen Eğitimde Nöro-Linguistik Programlama Tekniği'nin Bilgi Düzeyine Etkisi

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### Abstract

**Objective:** The present study was conducted as an experimental study and aimed at determining the effectiveness of the neuro-linguistic programing (NLP) technique used in the education given to nurses about central venous catheter (CVC) applications and blood culture collection on their knowledge level.

**Methods:** This present study was conducted with 65 nurses in two state hospitals in the Manisa Province, Turkey, between April 2015 and May 2015. Data were collected using three questionnaires prepared by the researchers in accordance with the relevant literature: "Nurses' Sociodemographic Characteristics Questionnaire," "Nurses' Perceptions of CVC Care and Blood Culture Collection Questionnaire," and "Nurses' Knowledge of CVC Care and Blood Culture Collection Questionnaire." Randomization was not performed in the experimental and control groups. The training with NLP techniques lasts longer than standard training. Because of the working conditions of the hospitals, some nurses had to leave early in training. The nurses who continued training formed the experimental group and those who had to leave early in training formed the control group.

**Results:** The mean scores obtained from the "Nurses' Knowledge of CVC Care and Blood Culture Collection Questionnaire" were  $0.62 \pm 0.13$  in the control group and  $0.63 \pm 0.08$  in the experimental group before the training and  $0.66 \pm 0.12$  in the control group and  $0.74 \pm 0.09$  in the experimental group after the training. While there was no significant difference between the two groups (control and experimental) before the education ( $p > 0.05$ ), there was a significant difference between them after the education ( $p < 0.05$ ).

**Conclusion:** In line with the study findings, it can be said that NLP techniques used in the training were effective.

**Keywords:** Neuro-linguistic programing, nursing personnel, nursing education

### Öz

**Amaç:** Bu çalışma, Santral venöz kateter (SVK) uygulamaları ve kan kültürü alınması konusunda hemşirelere verilen eğitimde Nöro-Linguistik Program (NLP) tekniği'nin etkinliğini belirlemek amacıyla yapılan deneysel bir çalışmadır.

**Yöntemler:** Manisa ilinde bulunan iki devlet hastanesinde Nisan-Mayıs 2015 tarihleri arasında 65 hemşire ile yürütüldü. Verilerin toplanmasında araştırmacı tarafından ilgili literatür doğrultusunda hazırlanan 3 bölümden oluşan "Hemşire Tanıtım Formu", "Hemşirelerin SVK Bakımı ve Kan Kültürü Alınmasına İlişkin Görüşleri" ve "SVK Bakımına ve Kan Kültürü Alınmasına İlişkin Bilgi Formu" kullanıldı. Deney ve kontrol grubu arasında randomizasyon yapılmadı. NLP teknikleriyle birlikte verilen eğitim, standart eğitime göre daha uzun sürmektedir. Hastanenin çalışma koşullarına göre bazı hemşireler eğitimden erken ayrılmak zorunda kaldı. Eğitimden erken ayrılmak zorunda kalan hemşireler kontrol grubunu, eğitime devam eden hemşireler deney grubunu oluşturdu.

**Bulgular:** Hemşirelerin eğitim öncesi SVK bakımına ve kan kültürü alınmasına yönelik bilgi formu puan ortalamasının kontrol grubunda  $0,62 \pm 0,13$ , deney grubunda  $0,63 \pm 0,08$ , eğitimden hemen sonra puan ortalamasının kontrol grubunda  $0,66 \pm 0,12$ , deney grubunda  $0,74 \pm 0,09$  olduğu saptandı. Deney ve kontrol grubunun eğitim öncesi dönemdeki puan ortalamaları arasında anlamlı bir fark saptanmazken ( $p > 0,05$ ), eğitim sonrası dönemdeki farkın istatistiksel olarak anlamlı olduğu saptandı ( $p < 0,05$ ).

**Sonuç:** Araştırma bulguları doğrultusunda, verilen eğitimde NLP tekniğinin etkili olduğu söylenebilir.

**Anahtar Kelimeler:** Nörolinguistik program, hemşire, eğitim

### INTRODUCTION

Patients who have complex diagnoses and need high-tech treatment require special care. Central venous catheter (CVC) applications are also included in this group (1). CVC application is an effective method in intravenous therapy (2). In the following cases, CVC applications should be performed: if rapid administration of fluid and blood products is needed in hypovolemic patients; if fluid replacement and total parenteral nutrition administration are needed in patients requiring prolonged intensive treatment;

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if the central venous pressure is to be measured; if hemodialysis is to be performed; if hyperosmolar and irritant liquids are to be administered for a long time; if chemotherapy is to be administered on an outpatient basis; if a patient is to receive blood and blood products; if peripheral venous access is not available due to surgery, intensive therapy, and tissue damage; or if peripheral veins are thin, thrombosed, or not clear (1, 3-5).

Infections related to the use of intravascular catheters increase mortality and morbidity rates, the length of hospital stays, and costs (1, 5-7). Therefore, catheter care is of importance in reducing the risk of infection. According to the Guidelines for the Prevention of Intravascular Catheter Related Infections published by the Centers for Disease Control and Prevention (CDC) in 2002, hand hygiene, continuing training, and complying with aseptic techniques are the prominent themes (8). In addition, precautions to be taken to prevent CVC-related infections should create a balance between patient safety and cost effectiveness. Because information, technology, and health organizations are in constant change, infection control and precautions to be taken should be changed in accordance with these changes (9). Therefore, as in all areas of health, the knowledge of health personnel regarding CVCs and blood culture should be improved and updated. In order to further increase the level and retention of knowledge, it is considered that the use of the neuro-linguistic programming (NLP) technique during training would be useful.

Neuro-linguistic programming is the reprogramming of the brain-nerve language. NLP helps the effective use of language to achieve successful behaviors and provides us with the programs and techniques to organize our nervous system so that we can achieve the goals we have set (10). NLP has been used in business, education, law, medicine, and psychotherapy to alter people's responses to stimuli so that they are able to regulate their environment and themselves in a better manner. There are several techniques used in NLP. These include anchoring, reframing, and changing personal history and strategies (11).

The NLP applications and objectives include legal practices, education, creative writing, health, therapy, and even personal relationships. Because NLP is applied in many areas of human life, its effects are quite wide-ranging. Because of its simple but profound concept and practical achievements, NLP has impressively developed (12) and has gained importance. NLP can be used as a teaching strategy at trainings given to nurses in order to ensure changes in knowledge, skills, and attitudes in nursing at a desired level (13).

This present study was planned to investigate the effects of the NLP technique taught to nurses during education on their knowledge level.

## METHODS

### Design

The present study conducted with nurses working in two state hospitals in the Manisa Province, Turkey, between April 2015 and May 2015 is an experimental study.

### Research Group

No sample was selected. Of the nurses, those who did not take NLP training and agreed to participate in the study (n=65) were included in the study. Randomization was not performed in the experimental and control groups. The training with NLP techniques lasts longer than standard training. Because of the working conditions of the hospitals, some nurses had to leave early in training. The nurses who continued training formed the experimental group (n=32) and those who had to leave early in training formed the control group (n=33). Both the groups were given the same training. However, additional NLP techniques were used in the training given in the experimental group.

### Research Questionnaire

To collect data, three questionnaires prepared by the researchers in accordance with the pertinent literature were used. One of the questionnaires was the "Nurses' Sociodemographic Characteristics Questionnaire," which includes 12 items questioning sociodemographic and professional characteristics of the nurses. Another questionnaire was the "Nurses' Perceptions of CVC Care and Blood Culture Collection Questionnaire," which includes 12 items questioning nurses' perceptions of CVC care and blood culture collection. The other questionnaire was the "Nurses' Knowledge of CVC Care and Blood Culture Collection Questionnaire," which includes 15 true and 15 false propositions assessing the nurses' knowledge of CVC care and blood culture collection (1, 2, 4, 5, 7, 9, 14-17). To assess the "Nurses' Knowledge of CVC Care and Blood Culture Collection Questionnaire," each correct answer was scored "1" and each wrong answer was scored "0." Then, all the scores were added and divided by 30 to find the mean score.

After the nurses were informed about the study, those who agreed to participate in the study were administered the "Nurses' Sociodemographic Characteristics Questionnaire," "Nurses' Perceptions of CVC Care and Blood Culture Collection Questionnaire," and "Nurses' Knowledge of CVC Care and Blood Culture Collection Questionnaire" and asked to fill them. While an instructor trained the nurses in the control group on "CVC applications and blood culture collection," the nurses in the experimental group were given training enhanced with NLP techniques by an instructor who had an NLP Practitioner certificate. In the training given to the experimental group, mirroring, anchoring, reframing, and belief change were applied as the NLP techniques. At the end of both the trainings, the nurses were asked to fill in the "Nurses' Perceptions of CVC Care and Blood Culture Collection Questionnaire" and "Nurses' Knowledge of CVC Care and Blood Culture Collection Questionnaire."

### Ethical Consideration

The study protocol was approved by the Ethics Committee of Celal Bayar University (consent date-number: 08/04/2015 20478486-186). In addition, the participants signed written informed consent. The hospitals' authorities also permitted to conduct the study.

### Statistical Analysis

The study data were analyzed using the Statistical Package for the Social Sciences (SPSS Inc.; Chicago, IL, USA) 16.0 statistical

program. To analyze the data, number-percentage distribution, arithmetic mean, paired t-test, Student's t-test, and chi-square test were used.  $p < 0.05$  was considered statistically significant.

**RESULTS**

**Descriptive Characteristics of the Nurses in the Experimental and Control Groups (n=65) (Table 1)**

This study was conducted with 65 nurses (33 in the control group and 32 in the experimental group). In the present study, the mean age of the nurses in the experimental group was  $33.21 \pm 6.88$  years. Of them, 87.5% were female, 56.3% had a high school and associate degree, 75.0% worked in the internal diseases and surgery unit, 71.9% worked in a patient-centered way, and 59.4% were satisfied with the work. The mean age of the nurses in the control group was  $34.15 \pm 5.67$  years. Of them, 93.9% were female, 51.5% had a high school and associate degree, 69.7% worked in the internal diseases and surgery unit,

78.8% worked in a patient-centered way, and 63.6% were satisfied with the work. A significant difference not detected between the nurses of experimental and control groups with regard to their descriptive characteristics. The results indicate that the groups are homogeneous.

**Perceptions of the Nurses in the Experimental and Control Groups About CVC Care and Blood Culture Collection (Table 2)**

Of the nurses in the experimental group, 37.5% had never and very rarely applied CVC at an equal rate, 65.6% preferred the subclavian vein for CVC application in the patients, 43.8% applied the catheter in the operating room, 53.1% used only sterile gloves as protective measures, 93.8% used sterile surgical drapes, 56.3% did not use the Trendelenburg position during CVC application on the internal/external jugular or subclavian vein, 81.2% started using catheters after chest X-rays were taken in their clinics, 56.3% did not scrubbed the stopper with an antiseptic solution before putting the blood culture into the bot-

**Table 1.** Descriptive characteristics of the nurses in the experimental and control groups (n=65)

	Experimental (n=32)		Control (n=33)		p
	n	%	n	%	
<b>Gender</b>					
Female	28	87.5	31	93.9	0.427**
Male	4	12.5	2	6.1	
<b>Mean age</b>	33.21±6.88		34.15±5.67		0.553*
<b>Education</b>					
High school and associate degree	18	56.3	17	51.5	0.702**
License and graduate	14	43.8	16	48.5	
<b>Marital status</b>					
Married	24	75.0	28	84.8	0.321**
Single	8	25.0	5	15.2	
<b>Clinic</b>					
Internal diseases and surgery unit	24	75.0	23	69.7	0.633**
Others (emergency services, dialysis, general intensive care unit)	8	25.0	10	30.3	
<b>Length of service (years)</b>	11.28±7.25		12.46±6.71		0.499*
<b>Unit</b>					
Intensive care and others	6	18.8	9	27.3	0.415**
Service	26	81.3	24	72.7	
<b>Working style</b>					
Patient-centered	23	71.9	26	78.8	0.518**
Work-centered	9	28.1	7	21.2	
<b>Daily Working hours</b>	12.21±6.93		11.66±6.78		0.747*
<b>Satisfied with the job?</b>					
Not satisfied, somewhat satisfied	13	40.6	12	36.4	0.724**
Satisfied	19	59.4	21	63.6	

p\* Independent samples t-test, p\*\* Chi-square test

**Table 2.** Perceptions of the nurses in the experimental and control groups about CVC care and blood culture collection

Perceptions	Experimental (n=32)		Control (n=33)	
	n	%	n	%
<b>Frequency of CVC administration unit</b>				
Never	12	37.5	15	45.5
Very rarely	12	37.5	6	18.2
Occasionally	3	9.4	2	6.1
Often	2	6.2	5	15.1
Very often	3	9.4	5	15.1
<b>Most preferred application sites of CVC in patients</b>				
Subclavian vein	21	65.6	23	69.8
Femoral vein	5	15.6	4	12.1
Internal jugular vein	4	12.6	3	9.1
External jugular vein	1	3.1	1	3.0
Cephalic, basilique, or brachial veins	1	3.1	2	6.0
<b>Specialty of the health care personnel who administered CVC</b>				
Cardiologist	10	31.3	13	39.4
Anesthetist	15	46.9	13	39.4
Cardiologist and anesthetist	7	21.8	7	21.2
<b>The place where CVC was administered</b>				
Bedside	11	34.4	12	36.4
Operating room	14	43.8	12	36.4
Bedside or operating room	3	9.4	4	12.1
Intensive care unit	4	12.4	5	15.1
<b>Protective measures taken by the physician implementing CVC</b>				
Wearing bonnets, masks, and goggles	2	6.3	4	12.1
Washing hands with the surgical aseptic technique	2	6.3	1	3.0
Wearing sterile gowns	-	0.0	-	-
Wearing sterile gloves	17	53.1	9	27.3
Doing a minimum of two or three of the above	8	24.9	13	39.4
Doing all the above	3	9.4	6	18.2
<b>Using perforated sterile surgical drapes to establish a sterile field</b>				
Yes	30	93.8	30	90.9
No	2	6.2	3	9.1

<b>Use of the Trendelenburg position during CVC application on the internal/external jugular or subclavian vein</b>				
Yes	14	43.8	15	45.5
No	18	56.3	18	54.5
<b>Chest X-ray assessment before using inserted CVC</b>				
Yes	26	81.2	25	75.8
No	6	18.8	8	24.2
<b>After opening the lid of the blood culture bottle, whether the stopper was scrubbed with an antiseptic solution before the blood culture taken was put into the bottle</b>				
Yes	14	43.8	22	66.7
No	18	56.3	11	33.3
<b>Most recently received training on CVC applications and blood culture collection</b>				
Never	10	31.3	15	45.5
1–6 months ago	13	40.6	16	48.5
7 or more months ago	9	28.1	2	6.0

CVC: central venous catheter

tle, and 40.6% received training on CVC application and blood culture collection 1–6 months ago. Further, for 46.9%, catheter application was performed by anesthetists. Of the nurses in the control group, 45.5% had never applied CVC, 69.8% preferred the subclavian vein for CVC application in the patients, 36.4% applied the catheter in the bedside and operating room at an equal rate, 39.4% used two or three protective measures together, 90.9% used sterile surgical drapes, 54.5% did not use the Trendelenburg position during CVC application on the internal/external jugular or subclavian vein, 75.8% started using catheters after chest X-rays were taken in their clinics, 66.7% scrubbed the stopper with an antiseptic solution before putting the blood culture into the bottle, and 48.5% received training on CVC application and blood culture collection 1–6 months ago. Further, for 39.4%, catheter application was performed by cardiologist/anesthetists at an equal rate.

**Comparison of the Mean Scores Obtained from the “Nurses’ Knowledge of CVC Care and Blood Culture Collection Questionnaire” before and after the training (Table 3)**

The mean scores obtained from the “Nurses’ Knowledge of CVC Care and Blood Culture Collection Questionnaire” were 0.62±0.13 in the control group and 0.63±0.08 in the experimental group before the training and 0.66±0.12 in the control group and 0.74±0.09 in the experimental group after the training. The

**Table 3.** Comparison of the mean scores obtained from the “nurses’ knowledge of CVC care and blood culture collection questionnaire” before and after the training

Perceptions	Experimental (n=32) Mean±SD	Control (n=33) Mean±SD	p*
Before the training	0.63±0.08	0.62±0.13	0.771
After the training	0.74±0.09	0.66±0.12	0.008
p**	0.000	0.052	

p\* Independent samples t-test, p\*\* Paired t-test. CVC: central venous catheter; SD: standard deviation

mean scores obtained by the nurses from the “Nurses’ Knowledge of CVC Care and Blood Culture Collection Questionnaire” before and after the training are presented in Table 3. While there was no significant difference between the mean scores obtained by the experimental and control groups before the training ( $p>0.05$ ), the difference was found to be statistically significant after the training ( $p<0.05$ ).

## DISCUSSION

The comparison of the nurses in the control and experimental groups in terms of individual characteristics such as age, gender, education level, marital status, length of service in the clinic, working style, daily working hours, and job satisfaction revealed that there was no significant difference between the groups. The results indicate that both the groups were similar in terms of individual characteristics.

As shown in Table 2, CVC was not very frequently implemented in the clinics where the nurses who participated in the present study worked. On the other hand, side effects associated with CVC are quite harmful to patients, the cost of the treatment is high, and more than 15% of the patients develop complications, all of which lead to the prolongation of the hospital stay and increase the mortality and morbidity rates; therefore, it is essential for nurses to know and implement CVC care (5, 16).

It was determined that CVC implementation was mostly performed by anesthetists in the operating room and that the most preferred site for the implementation was the subclavian vein. At the end of their study, Ovayolu et al. (5) reported that of the catheters, 54.8% were inserted at the bedside, 73.8% were inserted by anesthetists, and while half of the catheters were placed in the internal jugular vein, half were placed in the subclavian vein. The results of a literature review show that the risk of infection development is higher in internal jugular vein placements than in subclavian vein placements (18-21). The results of the present study are in line with those mentioned in the literature.

In the prevention of infections, care of the catheter insertion site, change of dressings, change of lumen caps, and cleaning of lumens play an important role (1). If catheter-related infections are suspected, it would be appropriate to collect blood both from the catheter and from the peripheral area (14). In order to prevent infection development, attention should be paid to blood culture collection and the practitioner should be knowl-

edgeable about the process. In the present study, 66.7% of the control group participants and 43.8% of the experimental group participants stated that they scrubbed the stopper with an anti-septic solution before putting the blood culture into the bottle, and about half of the participants in both the groups stated that they received training on CVC application and blood culture collection 1–6 months ago. This indicates that in-service training was performed at regular intervals in the hospitals where the study was conducted and that the hospitals paid adequate attention to the issue.

In order to prevent the occurrence of complications after CVC placement, before CVC is used, chest X-rays should be taken and examined (22). In the present study, a great majority of the nurses in both the groups reported that they started using catheters after chest X-rays were taken in their clinics. At the end of their study, Ovayolu et al. (5) reported that catheter use was started after chest X-rays were taken in three of the four units where they conducted the study.

In the present study, during the insertion of catheters, a few nurses in the control group wore only sterile gloves, less than half took two or three protective measures together, and almost all used perforated sterile surgical drapes, while more than half of the nurses in the experimental group wore only sterile gloves, a few took two or three protective measures together, and almost all used perforated sterile surgical drapes. In the study of Ovayolu et al. (5), it was determined that universal precautions were not fully complied with, barrier precautions and hand washing habits were not enough, sterile gloves and sterile drapes were used as a protective measure before CVC application in half of the units included in the study, only sterile gloves were used in 25.0% of the units, and sterile gloves, sterile drapes, masks, and bonnets were used in 25.0% of the units. In the present study, it can be said that in the hospitals where the study was conducted, basic protective measures were taken into account and importance was attributed to the issue to reduce the risk of infection, albeit not sufficiently.

Neuro-linguistic programming in health care has captured the interest of doctors, health care professionals, and managers (23). Learners may build better rapport with their patients, and this is the bedrock on which effective physician–patient communication is built (24).

In the present study, using in-service training enhanced with NLP techniques, it was seen that the mean scores obtained from the “Nurses’ Knowledge of CVC Care and Blood Culture Collection Questionnaire” increased in both the groups after the training. The high knowledge levels of nurses in general may be attributed to the fact that more than half of the nurses had prior training on the subject. When the nurses’ scores obtained from the “Nurses’ Knowledge of CVC Care and Blood Culture Collection Questionnaire” were compared in terms of time, while no significant difference was observed in the control group, the post-training scores were significantly higher than the pre-training scores in the experimental group. When the nurses’ scores obtained from the “Nurses’ Knowledge of CVC Care and Blood Culture Collection Questionnaire” were compared in terms of the differences between the two groups, no significant differ-

ence was observed between their pre-training scores. However, with regard to the post-training scores, the experimental group participants' scores were significantly higher than the control group participants' scores. The study results indicate that training programs in which NLP techniques are used improved the participants' knowledge levels. After a review of studies in different fields, the following was observed: In the study of Sahebal-zamani (25), it was concluded that programs on NLP should be conducted with students because NLP strategies contributed to the development of general health and its various dimensions. In the study of Bigley et al. (26) conducted with patients with claustrophobia, anxiety scores of the patients who participated in the NLP sessions decreased significantly. Therefore, it can be said that NLP is not only effective in studies in the field of health but also an effective teaching strategy for in-service trainings.

### Study Limitations

The study results cannot be generalized to all health institutions because the study included only the nurses who worked in two hospitals in the Manisa Province. Further, there was lack of randomization because of the working conditions of the hospitals, and data on CVC applications and blood culture collection were not obtained through observations but were based on the nurses' statements. Moreover, the numbers of studies conducted on NLP in Turkey are few. These are among the limitations of the study.

### CONCLUSION

At the end of the present study conducted to determine the efficacy of the NLP technique in trainings given to nurses, the group that received training in which NLP techniques were used achieved higher mean scores than did the group that received training in which NLP techniques were not used. Thus, it is recommended that NLP techniques should be actively used in the fields of education, trainings should be given in different fields and repeated at regular intervals, and studies should be conducted with different sample groups.

If training nurses and charge nurses who are interested in NLP and improve themselves in NLP and other clinical nurses who have enough knowledge about NLP use these techniques in clinical practices during the training they provide to their patients, this will be a useful method and they will be able to better communicate with patients and will enhance the efficacy of the training.

**Ethics Committee Approval:** Ethics committee approval was received for this study from the ethics committee of Celal Bayar University School of Medicine.

**Informed Consent:** Written informed consent was obtained from nurses who participated in this study.

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