A New Teachıng Strategy for Hand Hygıene Complıance Improvement in Nurses

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Abstract

Purpose: **This study has been planned in order to determine the effects of Neuro-linguistic Programming (NLP) techniques on gaining hand hygiene behaviors in nurses.**

Methods: **The sample of the study consisted of 68 nurses. The data were collected before the training, after the training and after one month after the training via "Information Form", "Hand Washing Behavior Evaluation Scale" and "Hand Observation Form". Participants were divided into two group and 34 of them was in intervention group where NLP was applied and rest were taken as a control group.**

Results: **There was a significant statistical difference between the intervention group and the control group regarding beliefs about hand washing, effect of the opinions on hand washing outside of work, perception of hand washing at work and related expectations, attitude and intention point averages but not in control beliefs, perceived behavior control and knowledge point averages. Hand hygiene compliance rates of nurses were before the training 55% vs. 51%, after the training 75% vs. 55% and after 1 month after the training 90.2% vs. 62% in intervention and control groups, respectively.**

Conclusions: **These results show that a program, that is enriched with Neuro-linguistic Programming (NLP) techniques are effective for gaining hand hygiene behavior in order to prevent infections related to health care.**

Keywords - **Hand Hygiene, Teaching, Nurses, Neurolinguistic Programming.**

I. INTRODUCTION

Nowadays, health care related infections are amongst the most important problems that health care institutions need to solve. World Health Organization (WHO) and Centers for Disease Control and Prevention (CDC) emphasize that hand hygiene is the sole most effective and important factor in preventing hospital infections; that the hand hygiene behaviors of health care workers play a central role in transmission of infectious agents and also that correct and effective hand hygiene applications are the easiest ways to prevent infections [1]–[5].

WHO guidelines on hand hygiene (2006) suggests establishment of training programs at a national level for the improvement of compliance to hand hygiene. However, recent studies regarding hand hygiene compliance show that the training wasn't effective in obtaining the desired compliance[6]. This is thought to be because hand hygiene behavior is complex and multidirectional [7]–[10].

Hand hygiene behavior patterns develop and settle in the early stages of life. Hand hygiene is a personal behavior model. The aim of hand hygiene training is to change the existing model in people and replace it with a new model. Lam et al. (2004) have observed patient contact frequency

and hand washing applications in a study to determine the factors related to the compliance of health care workers to hand hygiene at neonatal intensive care units and have developed a hand washing training program based on the problem[11]. At the end of the study, they have determined that after the training, compliance to hand hygiene has increased and the infection rates at the intensive care unit have decreased. Al-Tawfiq and Pittet (2013) have realized a study to improve hand hygiene compliance based on The Transtheoretical Model (TTM), Model of Motivational Design (ARCS) and the Theory of Planned Behavior (TPB) behavior altering theories and have emphasized that the training program they have established in this study is very important for improving awareness and that this training has improved hand hygiene compliance[12]. Bülbül (2007) has evaluated the efficacy of the training given for improving the hand washing habits of health care staff and has found that hand washing rates have increased after the training [13]. When the studies about improvement of hand hygiene compliance were examined, it was seen that regular training given to health care staff and efforts have affected the results. However, because the desired results could not be obtained, it was pointed out that different techniques and training should be implemented. Therefore, when different training methods are evaluated which aim for the desired beliefs and behaviors instead of our old beliefs, Neuro Linguistic Programming (NLP) techniques deals with behavior change in a cognitive, affective and psychomotor manner.These techniques help to manage neurological processes by comprising language and motivation models, how relationships are established and how individuals code data[14], [15].

NLP techniques has been shown to be effective in teaching medical and nursing school student's basic surgical skills and in transferring to implementation[16], [17]. Şen (2008)have found that the mental visualization technique has prepared the students for implementing basic adult life support skills and mental visualization technique could be used as a training method[18].

Research shows that NLP applications support learning. NLP would be an effective method in placement of hygiene behavior because it allows us to manage neurological processes and therefore transferring NLP techniques to training applications show importance.

This study was planned to determine the efficacy of Neuro-linguistic Programming (NLP) techniques on gaining hand hygiene behavior in nurses.

II. MATERİALS AND METHODS

The study was conducted by using the pre-test – last test experimental model with a control group at a university hospital. Permissions of the institution and the Ethic Committee were taken in order to conduct this study (Approval No. 173). By taking the willingness and voluntariness principle into account, permissions were taken from the agreeing nurses via the written "Informed Consent Form".

A. Subjects

The universe of the study consisted of 134 nurses. The sampling of the study consisted of 68 nurses who met the following criteria: having graduated from nursing school, having completed the oriantation training in the institution, being voluntary to attend the study, never having attended to a neuro-linguistic programming (NLP) related training. All of the nurses have attended to the intervention and control groups.

B. Instrument

"Information form", "Hand Washing Evaluation Scale" and "Hand Observation Form" were used as a means of data collection in the study. Information Form has been developed by the investigator in the light of literature, in order to determine the socio-demographic characteristics of the nurses who attended the study and to establish the intervention and control groups. The information form consists of nine questions and two sections. In the first section there are seven questions which include the age, sex, graduated school, total number of active working years, department and NLP training attandance status of the nurses and the second section has two questions regarding the importance of hand hygiene in reducing hospital infections.

"Hand Washing Evaluation Scale" has been developed by Bülbül (2007) in Turkey in accordance with the planned behavior model and the validity and reliability studies have been conducted[13]. With this scale, the following were evaluated in eight sections: beliefs regarding the consequences of hand washing, effect of the individuals' opinions about hand washing that are outside of the institution, the perception of expectations of individuals outside of the institution about hand washing, control beliefs, perceived behavior control, attitude, intention and knowledge of hand washing. The scale consists of 46 articles and its Cronbach alpha coefficient was found to be 0.79. The Cronbach alpha coefficient of the sub-scales are determined as follows: first factor: beliefs regarding the consequences of hand washing 0.72, second factor: effect of

the individuals' opinions about hand washing that are outside of the institution (subjective norm) 0.30, third factor: the perception of expectations of individuals outside of the institution about hand washing (normative beliefs) 0.61, fourth factor: control beliefs 0.68, fifth factor: perceived behavior control 0.66, sixth factor: attitude 0.64, seventh factor: intention 0.73 and eighth factor: knowledge of hand washing 0.62. Within the frameworks of scale reliability, it has examined the stability against time (continuity), equal (parallel) form managements and internal consistency criteria, re-applied the scale after two weeks after the first application using test – re-test technique and found the total article correlation coefficient as 0.88 after the test – re-test [13].In the hand washing behavior evaluation scale, the lowest score is 92 and highest score is 164. Hand washing behavior is achieved to a desired level as the score increases.

The Hand Observation Form was prepared by the Ministry of Health Performance Management and Quality Improvement Department Presidancy in accordance with the WHO Guide about Hand Hygiene in Health Care Services [19]. The data collection form is filled out by direct observation. The Hand Observation Form obveserves hand hygiene behavior for eight different indications. Within the framkework of thefive indication rule in Hand Hygiene "rubbing", "washing" and "none" options are chosen. Rubbing indicates rubbing with hand antiseptic; washing indicates hand washing with soap and water.

World Patient Safety Organization and WHO (2009) have published five conditions/indications that require application of hand hygiene[20]. Towards this application, the indications are respectively before contact with the patient, before aseptic process, after risk of exposure to body fluid, after contact with patient and after contact with patient environment. "Hand Observation Form" developed by WHO in accordance with five indications is translated to Turkish by the Ministry of Health Performance Management and Quality Improvement Department and it has been implemented in all organizations. This form is filled through direct observation. Hand hygiene behavior is observed for each different indication. The form is filled out by inpatient floor training nurses without informing the observed group. Training has been given to inpatient floor training nurses about the form to be filled out. At the same time, this form is one of the mandatory indicators of Ministry of Health, filled out each month by the inpatient floor training nurses and the organization's hand hygiene data is reached. Within the framework of five indications in hand hygiene rule, hand hygiene behavior is selected for

"scrubbing", "washing" and "none". Scrubbing means hand scrubbing with hand antiseptic; washing indicates hand wash with water and soap. The form consists of columns. Each of them is allocated for a professional category using the same code. Each column is independent. In the hand observation form, observed indications are classified as action as numerator and time for hand hygiene as denominator. These two variables determine compliance to be calculated. Compliance results can be calculated in general but can also be divided into professional category and indications. Compliance to hand hygiene is the ratio of number of actions to the appropriate number of times and represented by this formula; Compliance (%) = (Hand Hygiene Actions / Appropriate Time) x 100

C. Intervention

The hand hygiene program, contating NLP techniques was developed in the light of ADDIE education design principles and process comprising of five stages which are analysis, design, improvement, application and evaluation.Five stages in the model are interrelated and each stage provides data for the next.

The analysis phase which is the first step of ADDIE Model is completed by making needs analysis, learner analysis and content analysis. In the needs analysis, it is seen that hand hygiene is the most effective and simplest control method in the prevention of health care associated infections, healthcare staff are lacking in the implementation of suggested technique in conditions of five indications, compliance to hand hygiene is low despite the given education and training programs that include different approaches require structuring. In the learner's analysis; analysis of the target audience was made. In the content analysis; objective and target behavior are determined. In the design phase towards data obtained in analysis stage, it is decided that hand hygiene behavior can be learned through training programs prepared with NLP techniques.

"Hand Hygiene Development Program" is established in the development phase. Training program is finalized based on the opinions of faculty member's expert in infection, NLP and education fields.

In the implementation phase, two groups are established as an interventionand a control group. The implementation plan towards control group are prepared as a one-day training program. Standard hand hygiene training is mandatory for all healthcare staff within infection control measures. Subjects such as what is hand hygiene, importance of hand hygiene among infection control

measures and compliance to hand hygiene take place as the content of training. Subjects are given in a more cognitive level. Techniques that improve hand hygiene behavior of healthcare staff are not included in the program.

The implementation plan towards experimental group has been prepared as a three day training program. "Standard Hand Hygiene Education" and "NLP Applications" took place in the content of the training program. While standard training is towards development of cognitive level, NLP techniques include applications for development of attitude and psychomotor domains.

D. Hand Hygiene Training Guide with NLP Techniques

NLP program has been run on three consecutive days. In the first day, after a short warm up general information about hand hygiene and the role of hand hygiene in infection control measures besides general information about compliance problem in hand hygiene. In the second day, education program was on defining nurses' beliefs regarding hand hygiene, knowing the reasons, consequences and binding reasons, ability to make value definitions of nurses regarding hand hygiene and ability to express their needs or doubts in order to reach a new belief regarding hand hygiene. Last day mainly covered an education about the nurses being able to express necessary conditions for establishing the wanted hand hygiene belief, to express their positive and negative states regarding hand hygiene, to express verbally the behaviors that are expected to be changed to break negative anchors regarding hand hygiene.

In the evaluation phase; "Information Form" and "Hand Hygiene Behavior Assessment Scale" were applied to experimental and control groups prior to the training, right after the training and one month after the training. "Hand Hygiene Observation Form" was filled by trainee nurses upon observation prior to the training, right after the training and one month after the training in the areas where nurses work. Two types of assessments have been made as process and outcome assessment. Evaluation is done after each phase and at the end of the day, emerging shortcomings are corrected and continued to the next stage. Audio and visual materials, verbal feedback are used in the training. Result assessment is done right after and one month after the training.

E. Data Collection and Analysis

The study was conducted between January-May 2013. Nurses working in the hospital (N:134) constituted the population of research.Research sample consists of 68 voluntary nurses who were compliant with the criteria of research. Participants of the sample were divided into groups with the same probability using the simple random sampling method. All of the nurses who were within the framework of this study, had been sorted according to their surnames and were assigned numbers. 34 nurses to whom odd numbers were assigned, consituted the intervention group (Hand Hygiene Training with NLP Techniques Group), 34 nurses to whom even numbers were assigned, consituted the control group (Standard Hand Hygiene Training Group). In order to ensure the continued participation of the nurses to the study, necessary explanations had been made, reminders were made 48 hours before every training. To both intervention and control groups the "Information Form", "Hand Washing Behavior Evaluation Scale" and "Hand Observation Form" were applied before and after the training and 1 month after the training the "Information Form","Hand Washing Behavior Evaluation Scale and "Hand Observation Form" were applied. Hand hygiene observation forms were filled out by trainer nurses at the nurses' operating areas by observation before and after the training and after one month after the training.SPSS for Windows 15.0 package program was used for evaluation of the data obtained from the studies. In data evaluation, along with the descriptive statistical methods (frequency-percent, arithmetical mean, standard deviation), chi-squared test and t-test have been used for the analysis of group similarity and for independent groups at dual group comparisons; one way variance analysis (ANOVA) was used for related samples for intergroup comparison; the Bonferroni test was used for determining from which group the difference between the groups originated and values for which the p values were smaller than 0,05 were accepted as significant. One way variance (ANOVA) analysis has been made in the evaluation of differences among two or more independent groups.

III. RESULTS

The average age of the nurses was 30±7 in the control group, and was 28±5 years in the intervention group (p>0.05), 94.11% and 97.06%were women respectively. Among nurses, 52.94% had an undergraduate degree in control group and 61.67 in intervention group (p>0.05).

No statistically significant difference has been found when age, gender, departments they work, job experience, and education level between control and intervention groups. Demographic characteristics were similar between groups.

Hand washing behavior was determined via overall score before training was 130.26±9.97 in control group and

126.79±11.97 in intervention group (p>0.05) (Table 1). After the training the score in control group was 131.43±10.99, and 138.63±8.95 in intervention group (p<0.05). One month after the training, the control group had a score of 128.50±11.37, and the intervention group had 134.77±8.74 (p<0.05) (Table 1). When the average hand washing behavior points of the nurses in the intervention group are compared as before and after the training and one month after the training, a significant statistical change was found (F=27,156; p< 0,05). When the average hand washing behavior points of the nurses in the control group are compared as before and after the training and one month after the training, it was determined that there was no significant statistical change (F=2,081; p> 0,05). It was determined that the average point for the beliefs of the nurses in the intervention group about the consequences of hand washing is statistically significantly higher compared to the control group (t=2,491; p<0,05) (Table 1). It was determined that the average attitude point of the nurses in the intervention group after the training (t=3.051; p<0.05) and after 1 month after the training (t=2.132; p<0.05) are statistically significantly higher compared to the control group (Table1). In the research, Hand Hygiene Behavior Assessment Score has been found as above average and a significant difference has been found after the training in comparison to pre-training (p<0.05).

When the hand hygiene compliance of the nurses in the control and intervention groups are evaluated it was determined that; the hand hygiene compliance rate of the nurses in the control group prior to training were 51% and after the training 55%, after one month after the training 62%. The hand hygiene compliance rate of the intervention group prior to training was 55%, after the training 75% and after one month after the training 90.2%.

IV. Discussion

When nurses in control and experimental groups included in the context of study have been compared in terms of individual characteristics such as age, gender, department of employment, working years in the profession, education level, participation to hand hygiene education and NLP training; no statistically significant difference has been found among groups (p>0.05). Both groups were similar regarding demographic characteristics. Although primary aim of the study was to determine effect of NLP training on the compliance of hand hygiene and determinants of it. Hand hygiene training including NLP techniques had better results in compliance compared to the control group.

In this study, the average age of nurses in the control group was 30±7 and majority was (94.11%) women. Average age of nurses in the intervention group was 28±5 and majority was (97.06%) women. Nurses in control and experimental group were working respectively in bone marrow transplantation unit, operating theatre, surgical ward, emergency service, gynecology and obstetrics clinic, intensive care unit, sterilization unit, supervisor nurse and interventional areas and experience in the profession was 6-11 years. The majority of nurses have bachelor's degree. Healthcare staff participating in the study were found to be working in specialized clinics where infection control measures are high. This is thought to be important in terms of reflecting the results of the hand hygiene training.

When Hand Washing Evaluation Scale behavior score assessments are checked, pre-training scores were found to be average and a statistical difference has been found in the average score of the experimental group after the training. This scale provides the opportunity to evaluate in terms of information and attitude and reflection to behavior is seen with the hand hygiene observation form. A high ratio was observed for experimental group in the evaluation done with the hand hygiene observation form. Looking at the results, NLP applications are identified to have an active role in reaching target behavior. In particular, participants in the experimental group expressed their automatic hand hygiene application in the area they are working after the hand hygiene training with NLP techniques. Main purpose of the training has been reached and desired behavior was developed by the subjects. When this statement and results are considered, NLP applications ensured placement of desired model instead of habits and showed the success of the training.

In the study conducted by Allegranzi et al. arrangements such as system change, training, feedback, reminder posters in areas and institutional safety climate have been made in 5 countries (Costa Rica, Italy, Mali, Pakistan and Saudi Arabia) in order to improve hand hygiene compliance and at the end of the study it was found that the compliance had increased[21]. In a study, conducted by Salamati et al. to enhance hand hygiene compliance, they have planned a training together with a motivational meeting, and have found out that training together with the motivational meeting is more effective than just training and that this has improved the performance of hand hygiene compliance in health care staff[22]. Considering the researches on this issue, it is stated that training is effective for an increase in the compliance to hand hygiene but different educational models need to be implemented. The intended purpose is

more easily reached with training where different techniques are used. Therefore, NLP applications were used in our study as a different approach in educational technique. The success of hand hygiene education with NLP techniques was found to be high in comparison with other studies related with compliance to hand hygiene.

O'Boyle et al. state that beliefs related with results of hand-washing constitute intrinsic motivation, therefore affect the compliance to hand hygiene and reflected in professional behavior[23]. Also in our study, training conducted with NLP techniques was found to be effective in beliefs related with results of hand washing which is a sub-dimension ofthe hand washing behavior scale and must be repeated to show sustainability.

In the study, when average score for perception of expectation related with hand washing is considered, mean score after the training and one month after the training in relation to pre-training was found to be statistically significantly higher in the experimental group (Table 1). This dimension measures perception of healthcare staff on individual hand hygiene behavior compared to expectations of other individuals in the working environment. In the study of Yılmaz conducted to determine personal characteristics and effect of anxiety in the hand washing behavior of healthcare staff, effect on increasing compliance to hand washing is emphasized when rewarding parameters are used for nurses by the people within the organization[24]. Huis et al. established two groups in order to increase compliance to hand hygiene and determined an increase in the compliance to hand hygiene in the study where social harmony and leadership based, special team and leader assisted activities are implemented[25]. In a different study conducted by Huis et al. an increase in social and leadership activities is planned by optimizing training, reminders, feedback, supplies and organization, nurses' effects on hand hygiene compliance and contextual factors are evaluated, guidance of people within the organization on hand washing is identified to have an increase in nurses' compliance to hand hygiene[26]. Result of this study is found to be in parallel with similar researches. Training conducted using NLP techniques showed an increase in the perception of expectation related with hand washing of nurses.

In this study, statistically significant differences were determined in the hand hygiene attitudes and beliefs of nurses in the intervention group that took the training with the NLP techniques compared to the control group (Table 1). When the hand hygiene compliance of the participating nurses were evaluated it was determined that; the hand

hygiene compliance rate of the nurses in the intervention group before and after the training and after one month after the training is higher compared to the control group.

While one-day standard hand hygiene training is given to control group, some three-day NLP applications included hygiene training is given to the experimental group. As stated in the WHO report, hand hygiene training given to healthcare staff however do not cause a change in behavior[20]. Therefore, stereotyped beliefs, habits of healthcare staff need to be changed with the desired model instead. For this reason, when NLP applications are examined, it is seen that techniques that are used to provide support towards changing the habits and training reaches the objective in a shorter period of time.NLP techniques that we used in our study are a new and different approach where effectiveness of hand hygiene training is ensured. Results of the study support our hypothesis.

In mental belief altering studies, different NLP techniques such as belief inspection applications, belief altering chamber, belief chaining technique and anchoring method. The fact that more success was obtained in the beliefs and attitudes compared to the state prior to the training in the intervention group where we used these techniques, makes one think that the training was effective.

Belief inspection applications enable the changing or restructuring of old, limiting beliefs with new ones by expanding potential. These techniques make it possible to change and update the limiting beliefs by exposing positive intentions and presuppositions which constitute the basics of belief and by developing new answers and options to the question "why". In turn, this enables defining and accepting the positive intention behind belief, defining the assumptions and presuppositions which were not clearly stated in the basis of belief, expanding the perception of cause and effect about belief, finding answers to the question "how" for alternatives meeting the positive intention of belief, updating key relationships which play important roles in the establishment of aim and mission and in creation of new beliefs which will positively support in the identity level. However, it is necessary to define and present the "reasons" why these aims and values need to be believed in order to support beliefs regarding aims and goals or to be able to effective on people's beliefs. Value and belief inspection applications bring us closer to the beliefs regarding aims, skills and goals. Moreover, it includes simple but effective exercises for establishing new and reinforcing beliefs.

In this context, it was enabled with the training including NLP techniques, to replace the old beliefs and attitudes with new behavioral models. While classical hand hygiene trainings make a difference at the knowledge level, they do not make a difference to attitude and motion. It was observed that the training we have given with the NLP techniques has enabled the transfer of the training which was given on knowledge level into the muscle and automatic application.

The results of the study prove that the training program enriched with NLP techniques is effective in nurses in gaining hand hygiene behavior to prevent health care service related infections. However, in order to ensure permanent behavior changes, it can be said that especially control beliefs, perceived behavior control and intention dimensions parts of the training program should be enriched and the training should be repeated in given intervals.

Benefiting from NLP techniques due to easy and fast reaching of targets in training related to information, expectation, belief, perceived behavior control, attitude and intention related with hand hygiene in order to establish a hand hygiene behavior in the healthcare staff, dissemination of NLP techniques in trainings towards infection control organized for the healthcare staff, working individual-based considering different learning styles/representation systems of NLP techniques, repeating training with certain intervals, making similar researches with different sampling groups and working with a group that has never had a previous hand hygiene training are recommended.

In conclusion, hand hygiene training including NLP techniques resulted in better compliance and is beneficial compared to standart education methods. It has to be tested in other studies.

DECLARATION OF CONFLICTING INTERESTS

FUNDING

Table 1. Comparison of the Hand Washing Behavior Points of the Nurses in the Control and Intervention Groups according to Group

Group / Time		Control Group (n=34) Ort±SS	Intervention Group (n=34) Ort±SS	t*	p (sd:66)
Hand Washing Behaviors	Before the Training	130.26±9.97	126.79±11.97	1.298	.199
	After the Training	131.43±10.99	138.63±8.95	2.958	**.004****
	After 1 Month after the Training	128.50±11.37	134.77±8.74	2.549	**.013****
Beliefs about the Consequences of Hand Washing	Before the Training	3.58±.26	3.47±.35	1.434	.156
	After the Training	3.58±.26	3.79±.41	2.491	**.015****
	After 1 Month after the Training	3.37±.37	3.57±.37	1.887	.064
Effect of Opinions of People from outside of the Institution about Hand Washing	Before the Training	3.29±.52	3.17±.75	.745	.459
	After the Training	3.29±.52	3.58±.49	2.369	**.021****
	After 1 Month after the Training	3.29±.52	3.58±.49	2.369	**.021****
Perception of People in the Institution Related to Expectations about Hand Washing	Before the Training	3.52±.53	3.51±.49	.077	.939
	After the Training	3.52±.53	3.74±.42	1.814	.074
	After 1 Month after	3.52±.53	3.74±.42	1.814	.074

		the Training			
Control Beliefs	Before the Training	3.25±.40	3.16±,43	.805	.424
	After the Training	3.25±.40	3.23±.37	.217	.829
	After 1 Month after the Training	3.20±5.63	3.19±.36	1.042	.301
Perceived Behavior Control	Before the Training	3.16±.42	3.16±.45	.000	1.000
	After the Training	3.16±.42	3.20±.39	.447	.656
	After 1 Month after the Training	3.16±.42	3.20±.39	.447	.656
Attitude	Before the Training	3.48±.41	3.36±.43	1.192	.237
	After the Training	3.48±.41	3.75±.31	3.051	**.003****
	After 1 Month after the Training	3.48±,41	3.68±.37	2.132	**.037****
Intention	Before the Training	3.10±.63	3.03±.65	.437	.663
	After the Training	3.10±.63	3.34±.41	1.848	.069
	After 1 Month after the Training	3.10±.63	3.30±.42	1.578	.119
Information	Before the Training	2.98±.05	2.98±.05	.000	1.000
	After the Training	2.98±.05	3.00±.00	1.436	.156
	After 1 Month after the Training	2.98±.05	3.00±.00	1.436	.156

* t-test in independent groups

**p<,05

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