Therapeutic suggestion helps to cut back on drug intake for mechanically ventilated patients in intensive care unit

JUDIT SCHLANGER[1,*], GÁBOR FRITÚZ[2], KATALIN VARGA[3]

[1]Doctorate School of Psychology, Eötvös Loránd University, Budapest, Hungary
[2]Department of Anesthesiology and Intensive Care Unit, Semmelweis University, Budapest, Hungary
[3]Department of Affective Psychology, Eötvös Loránd University, Budapest, Hungary
*Corresponding author: Judit Schlanger; Doctorate School of Psychology, Eötvös Loránd University;
Izabella utca 46, H-1064 Budapest, Hungary; Phone/Fax: +36-1-461-2691; E-mail: judit.schlanger@gmail.com

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Abstract: Research was conducted on ventilated patients treated in an intensive care unit (ICU) under identical circumstances; patients were divided into two groups (subsequently proved statistically identical as to age and Simplified Acute Physiology Score II [SAPS II]). One group was treated with positive suggestions for 15–20 min a day based on a predetermined scheme, but tailored to the individual patient, while the control group received no auxiliary psychological treatment. Our goal was to test the effects of positive communication in this special clinical situation. In this section of the research, the subsequent data collection was aimed to reveal whether any change in drug need could be demonstrated upon the influence of suggestions as compared to the control group. Owing to the strict recruitment criteria, a relatively small sample (suggestion group $n = 15$, control group $n = 10$) was available during the approximately nine-month period of research. As an outcome of suggestions, there was a significant drop in benzodiazepine ($p < 0.005$), opioid ($p < 0.001$), and the α2-agonist ($p < 0.05$) intake. All this justifies the presence of therapeutic suggestions among the therapies used in ICUs. However, repeating the trial on a larger sample of patients would be recommended.

Keywords: therapeutic suggestion, intensive ward, critical state, ventilated patient, drug need, opioid consumption, benzodiazepine consumption, sedatives, positive communication

Introduction

Suggestion is a simple and cheap technique that can be used easily and highly effectively in healing; it is as old as humankind, yet it has entered the scope of vision of modern medicine only recently. It is nonetheless constantly present in the practice of health care – consciously or unconsciously, positively or negatively – exerting most diverse influences on the patients.

More and more research results testify to the effectiveness of suggestive techniques in the medical practice: positive communication decreases the duration of the therapy [1–8], the pain of patients [4–6, 9], and the chance of complications [7, 10–13]; cuts back drug need [6, 13–15]; and it also increases cost effectiveness [16, 17], cooperation [1, 2], and the chance of survival [8]. This topic was recommended to professions in many Hungarian publications [18–21].

Although the number of somatic doctors in hospitals who use hypnosis and positive suggestions has grown in recent decades, there are still only a few institutions in which positive communication is included in the scope of everyday therapies. This is in spite of the fact that the majority of the doctor–patient interactions do not need professional hypnotic inductions, since a patient overcome by worries, fears, or pain is more susceptible to suggestions than usual [22–24].

The degree of suggestibility depends on mental constitution, but certain life situations may enhance receptiveness to suggestions. Altered states of consciousness – e.g., feelings of helplessness, fear, or great emotional pressure, as well as being in new situations in which the lack of experience causes uncertainty – intensify suggestibility [18, 23, 25]. In these situations, any piece of information of an everyday communication (a word, accent, facial gesture, or an inscription, a picture, etc.) may be suggestive,

in both positive and negative senses [26]. Hemming and hawing, whispering by the bedside, the "ominous silence," the ambiguous accents, or just an awkwardly worded but benevolent piece of information may worsen a suggestible patient's mental and physical state [22].

The ICU circumstances, for the reasons mentioned above, are well suited to enhance the patients' suggestibility, and as a result, patients may respond stronger to all impulses coming from their environment. Our research team has found that targeted positive suggestions may considerably improve the effectiveness of somatic therapy in this situation, and the need for the administration of drugs decreases. This leads to the reduction of costs and the elimination of side effects as well.

It is therefore particularly important to introduce this recognition to the widest possible circle of doctors so that they may also make use of it.

Materials and Methods

Procedure of research

The beneficial effects (decrease of bleeding, nausea, vomiting, pain, or drug need) of positive suggestions before and/or during operations have been widely discussed in the literature. Relying on these positive experiences, we applied the method to ICU patients in invasive ventilation therapy. The starting postulate was that ventilated patients treated in intensive wards are in altered states of consciousness, mostly in negative trance. We planned to utilize this state of enhanced suggestibility to change the patients' negative trance with positive suggestions and promote their recovery with continuous reassuring information.

The general aim of our research was to improve the current information methods by elaborating a more effective communication given to ICU patients during invasive respiration therapy. For this reason, the positive suggestion-based communication's effects were tested in this special clinical situation. The research (part of the OTKA-supported project T-043751 led by Katalin Varga) was conducted in two groups of ventilated patients at the Department of Anesthesiology and Intensive Care Unit of the Semmelweis Medical University (Semmelweis Egyetem Aneszteziológiai és Intenzív Terápiás Klinika [SE AITK]) from November 2005 until July 2006. All patients received the same somatic treatment (all kinds of invasive mechanical ventilations, medications, and other procedures based on the general protocol of the ICU); the only difference was that the suggestion group also received information (mostly about mechanical ventilation) in the form of positive suggestions from the suggestion section of the research team for 15–20 min a day. The control group did not receive any complementary psychological support.

Originally, the research aimed to test the patients from a psychological viewpoint, with questionnaires, also taking into account the major therapy indicators (duration of treatment, duration of mechanical ventilation, mortality). It was realized after the trial was over that the use of drugs could be retraced with the help of the patients' medical charts. It is an important fact to note because this way our findings can address the effect of suggestions on drug-use, despite the fact that the suggestions used in the study were not directed at this target. The publications of the research (arrangement, method, psychological results) are available [27–32]. In this part of the analysis, we concentrate only to the drug intake and major therapy indicators that are necessary for the interpretation.

Eligibility and recruitment

The patients to be included in the trial were selected on the basis of parameters predetermined by the doctors participating in the research:

- age above 18,
- intact hearing (perception of normal human speech),
- being mechanically ventilated for at least 48 h,
- without a diagnosis of grave chronic obstructive pulmonary disease (COPD),
- not having an end-stage disease,
- absence of any psychiatric disease,
- absence of any addiction (absence of abstinence symptoms),
- if unconscious: high probability of the return of space/time orientation,
- chance of survival is at least 30 days, as predicted by the physician.

These strict criteria were necessary for more homogeneous groups of patients. It was therefore our aim to exclude patients in the terminal stage of an illness or with chronic respiratory conditions. It was important that the psychic picture should not be dominated by the absence of an addictive material or an earlier developed psychiatric condition which might influence the process of recovery. Probably, the most specific criterion was intact hearing, but it was a logical requirement of the method of verbal suggestions.

Due to the strict selection criteria, the number of eligible patients was very low; we found 25 patients at SE AITK over the nine-month research period who satisfied the criteria. They were randomly allocated into the suggestion and control groups by drawing lots.

The physical state of the patients at the time of inclusion was measured by the SAPS II [33], which score informs us of expected mortality and as such provides another dimension for the comparison of the two groups.

Research method

During the research period, we visited the patients in the suggestion group daily. The guidelines for information based on positive suggestion for ventilated patients on ICU were elaborated by Varga and Diószeghy [34, 35]. This was the first time these guidelines were tested clinically, and they could be adjusted to the individual needs of patients.

The protocol was divided into four chapters aligned with the four consecutive stages of ventilation: initiation, maintenance, weaning, and possible re-intubation.

Since, in all four phases, the patients' states of mind are different, in each phase, the patients need different psychological support in addition to the basic suggestions (of control, attention to improvement, enrichment of environmental stimuli). Consequently, different targeted suggestions were elaborated for each phase.

During the research, the phases of suggestions obviously overlapped somewhat, for, on the one hand, the suggestion team could not be present on the ward continuously (24 h a day). As a result, most often, the team could tell the patients the initiation part of the protocol only later, when ventilation was already in progress, and not before the start of the respiration therapy. On the other hand, we deemed it important to start with the suggestions aimed at weaning still during the maintenance of ventilation, and to mention the possible need for re-intubation when finishing of ventilation was drawing close.

During ventilation, several patients are unconscious, but it is no reason to stop psychological support, for suggestions have already been used successfully in coma as well [36].

Suggestions

In addition to problems and fears caused by the basic illness, ventilation brings new inconveniences to the patients. It is not easy to accustom oneself to cooperating with the machine and the staff, for one has to relinquish control over a fundamental yet controllable physiological function. The stifling sensation, the pressure of the tube, and the state of helplessness as well as the lack of information may stimulate diverse reactions in the patient, often hindering his/her own recovery. For prevention's sake, uncooperative patients are kept in the state of sleep induced by sedatives, which is costly, not to mention the side effects. This can be prevented by positively worded, sufficient information.

"Hospitals are safe places" types of suggestions are basic sentences that we tried to repeat on each occasion:

> *The essential thing is that you have been brought to a hospital/ward where everything is available to provide you with the best treatment. … The doctors, nurses, and all the fantastic machines surrounding you are active to help your organism find the way back to healthy, harmonious functioning. … All this busy activity, the rattling and beeping of the machines, mean that you are in safety, for everything here is working for the goal of your recovery as soon as possible.*

In addition, we stressed in the phase of initiation that "ventilation is useful for you", "the machine helps your breathing" (and it does not breathe instead of you), and during ventilation, "you cannot speak, but this – similarly to the treatment – is naturally only temporary":

> *The machine helps you with breathing until your body recovers enough strength to resume breathing independently as in the normal state.*

The patient was informed of the need for secretion suctioning during ventilation, with stress on its "usefulness" and "short duration". When needed, the advantages of tracheotomy were also outlined.

The patients were kept informed about the improvement of their state and health parameters in comprehensible terms, and the suggestion team tried to direct their attention to a positive direction through other means.

The favorable interpretive frame of the situation was built of analogies and metaphors based on the interests and experiences of the patient. Learned helplessness was prevented or weakened by providing the experience of being in control.

To prepare for weaning, this sentence was repeated several times:

> *As a result of healing, your body has gained enough strength so you don't need the help of the machine for breathing now.*

We made the patients aware that, at the beginning of independent respiration, they would have different sensations from what they were used to, because the respiratory muscles had been out of use for some time, so they were somewhat weaker now.

> *You'll see how interesting it will be to use your own muscles again, to draw a pleasant deep breath.*

To avoid frustration, it was stressed that:

> *It is perfectly normal that, temporarily, you may need the help of the machine again.*

Patients were prepared for the respiratory training and the process of inhalation, and involved in their recovery by setting realistic goals with their participation.

The activation of the patients and the guiding of their attention to positive goals may take place simultaneously:

Please note carefully which are the positions (lying, sitting, walking, etc.) in which breathing is easier and more pleasant.

Being in control may also be strengthened by providing the patients with the possibility of making a decision. There are several moments to do so:

How would you like to get fresh air (oxygen) – through a nasal tube or a mask? … Spit out the coughed up secretion or swallow it, as is more comfortable for you. … When do you want to get up?

The sense of failure following re-intubation is certainly decreased when the patients learn that "this is natural and frequent" and "it is only necessary until everyone is convinced your independent breathing has been restored safely."

Hard breathing or the sensation of suffocation could be easily reframed:

When you feel like this, you have noticed the message of your body: you must take a pleasant deep breath. Your body expresses with this signal that it needs a slow, 'relaxing,' deep sigh.

The feeling of fatigue was compared to the pleasant experience of tired muscles:

It is like the feeling of the pleasantly sore muscles after a training session (excursion, etc.), which is a sign of the strengthening of the muscles.

To prevent anxiety, the patient's interest was directed to inner safety and the naturalness of independent breathing:

Watch for the quickly emerging pleasant rhythm of your own breathing, how your organism is able to achieve it by itself. You may rely more and more safely on your own breathing, so that it will soon become just as natural as it was before your illness, so natural that you will no longer pay attention to it.

(In detail, see the protocol [34, 35].)

After leaving the ICU, two psychological survey tests were taken, the results of which have appeared in several publications [27–32]; they are not discussed in this article.

Data collection

In this part of the research, most of the data collection was performed after closing the trial. The patients' age, drug intake, as well as the duration of time they spent in mechanical ventilation and in the ICU were registered later from medical charts. The SAPS II was completed on the first mechanically ventilated day.

Sedatives used in the intensive care unit

When examining drug requirement, only those drugs which were used for long, continuous sedation, anesthesia, and/or analgesia were recorded. The selection of the drug type and the determination of the dose were based on the general protocol of the ICU, aimed

Table I Active agents, trade names, and classes of drugs gleaned from the medical charts

Active agents	Trade names	Classes of drugs
Fentanyl	Fentanyl	Opioids
Morphine	MO	Opioids
Nalbuphine	Nubain	Opioids
Pethidine/meperidine	Dolargan	Opioids
Alprasolam	Frontin, Xanax	Benzodiazepines
Clonazepam	Rivotril	Benzodiazepines
Diazepam	Seduxen	Benzodiazepines
Midasolam	Dormicum	Benzodiazepines
Citalopram	Seropram	Antidepressants
Sertaline	Zoloft	Antidepressants
Meprobamate	Andaxin	Anxiolytics
Clonidine	Catapressan	α2-Agonists
Propofol	Diprivan	Narcotics

to produce a quiet, cooperating patient, synchronous with the ventilating machine. We examined whether there was a change in the necessary drug amount upon therapeutic suggestions. The drugs used in the ICU are listed in *Table I*. We recorded drug use broken down to days, also indicating whether the patient was or was not mechanically ventilated the given day (ventilation means that the patient was on the machine for more than 12 h).

As can be seen on the *Table I*, six drug classes were examined. In two of the drug classes, there were four active agents; in one class, there were two; and in three, there was one. The latter groups can be evaluated directly, while the opioids and benzodaizepines were equalized within their classes with the following calculations:

$$\text{fentanyl} = \text{morphine}/200 = \text{meperidine}/200 = \text{nalbuphine}/2000,$$

$$\text{alprasolam} = \text{clonazepam} = \text{diazepam}/20 = \text{midasolam}/5,$$

(based on the general protocol of the ICU and on the literature data [37–40]).

The groups of antidepressants and anxiolitycs can not be compared, but each of the three agents was administered to only one patient, two of them in the control group (antidepressants), and one in the suggestion group (anxiolytics).

Data of patients included in the trial

The patients included in the study were randomly selected (group assignment drawn from an envelope) for the suggestion ($n = 15$) and the control group ($n = 10$), after signing the patient informed and consent form (if necessary, the form was signed by the nearest relative, as defined by the Hungarian Health Act 1997th CLIV). The mean age and SAPS II values did not differ statistically; the duration of mechanical ventilation was also statistically identical in the two groups (see *Table II*). The calculations of drug use were only made for the period of ventilation.

Statistical analysis

To compare the baseline characteristics (age, SAPS II, ventilated day), we applied independent-samples *t*-test. The use of the drug classes was examined with general linear model (using ventilated days as covariant), where a ventilated day of the patient was defined as unit in the suggestion (131 days) or the control group (83 days) (see *Table III* and *Fig. 1*). The whole statistical analysis was made by SPSS 20.

Results

In recent publication, the drug intake was analyzed statistically during mechanical ventilation (as can be seen in *Table II*, this period was identical in the two groups).

As can be seen, mean drug intake was less in the suggestion group in all four drug classes: the difference was more than 65% in the group of opioids ($F(1, 210) = 8.64$; $p < 0.005$), benzodiazepines ($F(1, 210) = 15.83$; $p < 0.001$), and clonidine ($F(1, 210) = 5.626$; $p < 0.05$), which is statistically significant. The difference in propofol intake was not statistically significant ($F(1, 210) = 0.39$; $p > 0.1$).

It is an important finding that, in the suggestion group, drug intake – in these drug classes (except for propofol) – was less not only on average, but also in total (during both the mechanical ventilation and the whole ICU therapy), even though patients who received suggestion therapy spent twice as much time in the ICU than the control patients (see *Table III*).

There was a marked difference in percentage between the two groups regarding survival rate; this rate was much better in the suggestion group. It is to be regretted that because of the low number of patients, data did not allow for more subtle statistical analysis. (Therefore, it would be advisable to repeat this study

Table II Baseline characteristics of the two groups

	Group	Mean	*SD*	$F(1, 23)$	*p*
Age	Control	64.60	11.99	0.91	0.349
	Suggestion	56.93	16.87		
SAPS II	Control	46.90	18.03	0.04	0.841
	Suggestion	46.33	16.49		
Ventilated days	Control	8.30	4.35	2.00	0.171
	Suggestion	8.73	6.43		

Table III Comparative drug usage table

		Opioids (Fentanyl)	Benzodiazepines (Alprasolam)	Clonidine	Propofol
Total drug use within the period of ICU therapy (mg)	Control group	17.642	695.634	2.625	8860
	Suggestions-treated group	9.992	399.9	1.2	11320
Total drug use within the period of mechanical ventilation (mg)	Control group	17.441	690.644	2.025	8860
	Suggestions-treated group	9.476	371.2	1.05	11320
Per day mean drug use, calculated from total number of days on ventilation (mg)	Control group*	0.21	8.235	0.024	106.747
	Suggestions-treated group*	0.072	2.811	0.008	86.412
	Percentage of the average drug use in the suggestions-treated group as compared to the control group (100%)**	34.4% ($p < 0.001$)	34.1% ($p < 0.005$)	32.4% ($p < 0.05$)	80.9% (not significant)

Please note that at each drug severe drop in quantity is shown for the suggestions-treated group, whereby 3 are significant results.
*Total opioids, benzodiazepines, clonidine, and propofol consumption of the two patient groups within the period of mechanical ventilation, averaged by number of days of group members spent on ventilation.
**Ratio of control and suggestions-treated group's average drug use and their significance levels.

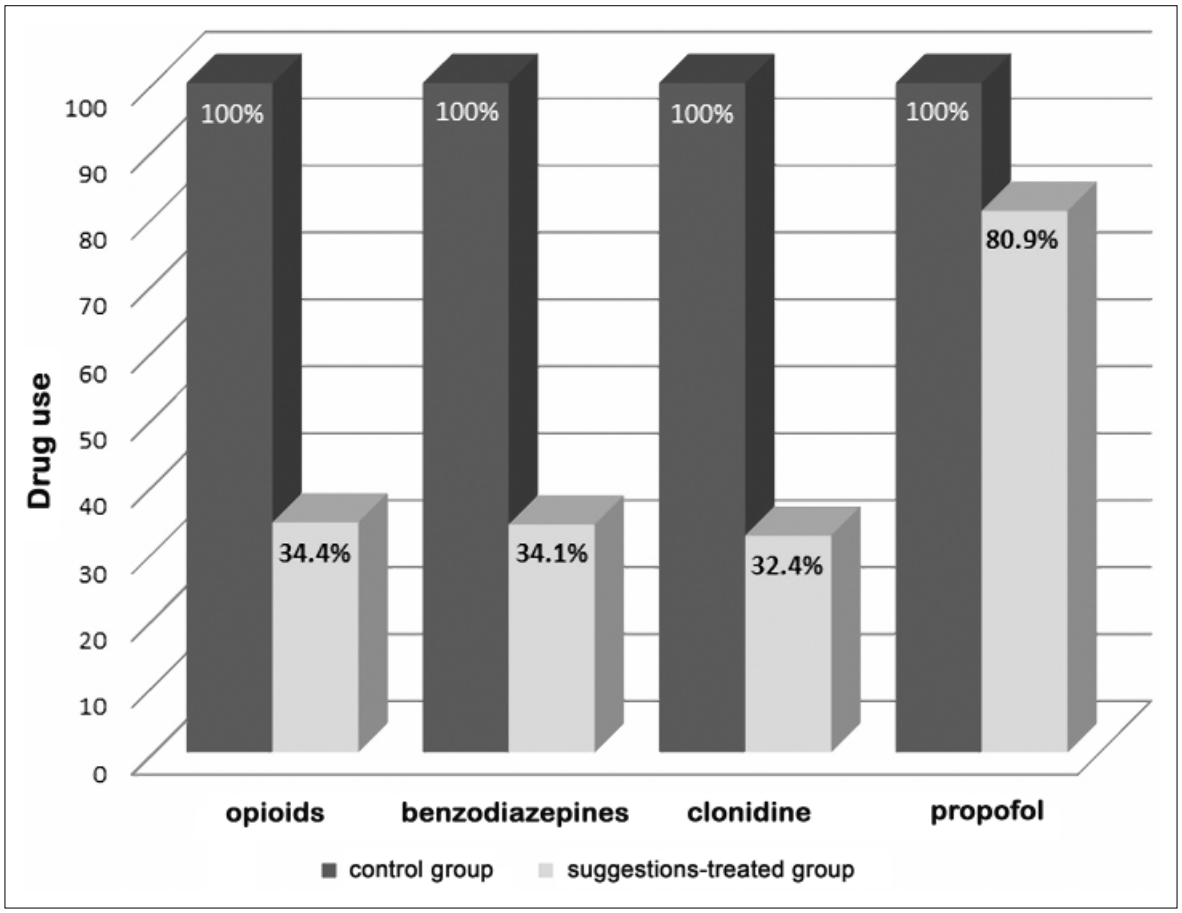

Fig. 1. Mean drug use as compared to the control group (100%) during mechanical ventilation. The use of opioids ($p < 0.001$), benzodiazepines ($p < 0.005$), and the α2-agonist (clonidine) ($p < 0.05$) was cut back significantly, by about 65%, and nearly 20% less narcotics (propofol) (not significant) were also required during the days of mechanical ventilation

on a larger sample to analyze statistically the survival rate.)

Discussion

The research was aimed to clarify whether the therapeutic application of positive suggestions would exert an influence on the recovery of ventilated patients and whether it affected drug consumption.

On the average, the two groups spent identical times in mechanical ventilation. Upon the impact of suggestions, there was more than 65% less in drug use in the two major groups of sedatives – opioids ($p < 0.001$) and benzodiazepines ($p < 0.005$) – as well as in the α2-agonist group ($p < 0.05$). This difference was not only apparent in the average calculated for ventilated days but also in the total drug consumption of the two groups of patients, in spite of the fact that the suggestion group was larger than the control group.

It is evident that, if the drug use is decreased, the incidence of side effects will be less. In our case, this (such as allergic reaction, destabilization of circulation, respiratory depression, drug addiction, amnesia, etc.) further increases the importance of therapeutic suggestion. It is notable that, in parallel with the reduction of drug intake, the patients in the suggestion group leaved the ICU with more pleasant experiences [28, 32].

In line with the original orientation of the research, the analysis of the psychological tests and the basic physical figures also confirmed that positive communication was useful and effective [27–32].

On the basis of the above-described results, it may be concluded that the use of positive suggestions as an adjunct therapy has considerable advantages for both patients and ICUs.

Several studies have verified the effectiveness of the positive suggestion methods in various areas of health care – in both healing and financing [16, 17]. The great advantage of the method is that it is easy to learn without psychological qualifications, as it only requires deliberateness, attention, and some practice. Positive suggestions can be applied by the ICU staff during their ordinary activities around the patients, requiring no additional time. It needs no appliances; its total cost amounts to a single training course, which yields a rich return not only in the reduction of drug intake through this technique, but also in the outcome of having calmer, more cooperative, and more certainly recovering patients.

* * *

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