

Sensing an improvement: an experimental study to evaluate the use of aromatherapy, massage and periods of rest in an intensive care unit

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There is widespread belief that the use of aromatherapy and massage in an intensive care environment offers a means of increasing the quality of sensory input that patients receive, as well as reducing levels of stress and anxiety. Despite a wealth of anecdotal evidence in support of these claims, there have been few objective studies to evaluate the effects of these therapies. In this experimental study 122 patients admitted to a general intensive care unit were randomly allocated to receive either massage, aromatherapy using essential oil of lavender, or a period of rest. Both pre- and post-therapy assessments included physiological stress indicators and patients' evaluation of their anxiety levels, mood and ability to cope with their intensive care experience. Ninety-three patients (77%) were able to complete subjective assessments. There were no statistically significant differences in the physiological stress indicators or observed or reported behaviour of patients' ability to cope following any of the three interventions. However, those patients who received aromatherapy reported significantly greater improvement in their mood and perceived levels of anxiety. They also felt less anxious and more positive immediately following the therapy, although this effect was not sustained or cumulative.

INTRODUCTION

Patients requiring admission to an intensive care unit are in the throes of an acute physical crisis. Moreover, they

also have to cope not only with a physical emergency requiring urgent action but also severe emotional and psychological trauma. There is also evidence to suggest that receiving treatment in an intensive care unit (ICU) can be a depersonalizing and dehumanizing experience which can lead to increasing demotivation, apathy and withdrawal (Meyer *et al.* 1961).

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Despite receiving constant attention, critically ill patients may suffer intense loneliness as a result of their physical and emotional seclusion from both family and carers. This feeling of isolation may be heightened and their perception of touch distorted if they are unable to see or hear clearly as a consequence of fluctuating conscious levels, drugs or enforced immobility. They may also be unable to interpret incoming stimuli because of sensory deprivation or, alternatively, overload.

Patients' feelings of solitude may be intensified when visitors refrain from touching the patient for fear of causing harm. There is evidence to suggest that the more seriously ill the patient, the less physical contact he/she receives from the nurses responsible for providing care (Barnett 1972). Nurses may avoid spontaneous, comforting touch in order to avoid disturbing sensitive monitoring equipment. Storlie (cited by Clement 1983) describes this as 'professional autism', that is when technological demands almost exclusively focus the nurse's attention on technical aspects rather than on a holistic approach to care. Worrell (1977) also considers that professionals may deliberately distance themselves from seriously ill patients as a defence mechanism against personal distress and to protect themselves from the need to confront their own mortality.

TOUCH IN INTENSIVE CARE UNITS

Non-verbal communication has been shown to be essential for normal physical and mental development (Frank 1957, Montagu 1971). Touch, as a modality on non-verbal communication, is often referred to as being expressive or instrumental. Expressive touch is spontaneous, affective and not directed towards achieving a physical procedure, whereas instrumental touch is a deliberate action intended to achieve a physical task. Rubin (1963) suggests that expressive touch is an effective means of communicating caring and comfort to patients experiencing isolation and vulnerability. This view is endorsed by McCorkle (1974) who investigated the effects of touch as a means of non-verbal communication with seriously ill patients and found that nurses effectively used this medium to establish rapport with patients within a relatively short period of time.

Weiss (1979) proposes that issues such as duration, location, action, sensation, intensity and frequency of touch act as symbols to the receiver by carrying implied messages. She suggests that touch is more likely to stimulate an increase in nervous activity when it is strong in intensity and applied to highly innervated areas of the body, for example over the vital organs of the body and the arteries. Alternatively, touch which is infrequent, of weak intensity and soothingly applied to diffusely innervated areas such as the outside of the limbs, back and scalp has the potential to reduce nervous activity. Other factors such as cultural background, previous experience of touch

and the attitudes of family and friends also influence how individuals interpret these messages.

Planning

Planning the use of purposeful touch such as massage for intensive care patients thus requires consideration of the cultural and social meanings that individuals may attach to such a means of expression. It should also be recognized that seriously ill patients may be inhibited in expressing their unwillingness to receive this type of touch because of low energy levels, feelings of vulnerability or communication difficulties. It is important that attention is paid to the individual patient's preferences and responsiveness in order to ensure that the therapy is not perceived as yet another intervention rather than a welcome and sensitive means of comfort and communication.

These considerations have important implications for nurses who may be planning to introduce touch therapies within intensive care units; in addition nurses may experience increased stress in developing closer relationships with patients.

MASSAGE AND AROMATHERAPY AS MODALITIES FOR TOUCH

Massage may be described as the application of various systematic and usually rhythmic hand movements performed on the soft tissues of the body. These movements produce different effects depending on a number of factors such as the type and speed of movements, the pressure exerted by the hands, fingers or thumbs and the area of body treated. Massage is considered by many to be a therapy in its own right, offering the potential to relieve tension, reduce fatigue and to enhance the body's ability to heal itself (Harrison 1986, Eyerman 1987). Anecdotal claims by nurse practitioners suggest that massage improves the nurse-patient relationship, provides comfort and relieves anxiety and tension (Hollinger 1980, Byass 1988). Others view massage as a natural extension to the nurse's role (Pearson 1988): to this end, in many nursing development units, staff are currently being trained to include massage in their daily nursing care as a treatment which is complementary to conventional nursing.

Massage can also provide a medium for the use of aromatic oils, which may be added to the lubricating agent or inhaled by evaporation. This technique is known as aromatherapy. A range of over 200 essential oils may be used to achieve differing effects. Their precise mode of action is unclear but they are believed to influence the emotional status of the recipient by a combination of absorption, when applied to the skin, and inhalation, following evaporation from the skin during massage or when heated in burners or in steam (Valnet 1986).

One of the oils most widely used is lavender, which is

claimed to have a relaxing and calming effect and is also one of the least toxic and allergenic of all the essential oils (Tisserand 1989). Recent laboratory tests suggest that the odour of lavender may have a sedative effect on brain wave patterns (Birchall 1990) and so is likely to be particularly useful in stressful circumstances such as in intensive care settings.

Paucity of research

There is currently a paucity of sound research evidence which can help guide practice in relation to the appropriate use of both massage and aromatherapy. Perhaps this is not altogether surprising given the complex nature of touch and the lack of valid and reliable tools to measure abstract and affective concepts such as coping, mood and loneliness. Attempts have been made to measure autonomic arousal following massage by using physiological responses such as systolic and diastolic blood pressure, heart rate and galvanic skin response. In one of the earliest published studies to use these indicators, Kaufman (1964) measured the responses of 36 patients both before and after receiving a back rub, but failed to demonstrate a significant difference in physiological outcomes.

In a study using a similar design, Longworth (1982) also failed to demonstrate an improvement in physiological indicators following back massage in a healthy volunteer sample, although a significant improvement was noted in the reported state of anxiety following the therapy. Simms (1986) also used a within-subjects design to evaluate the psychological effects of slow stroke back massage given to six women receiving treatment for cancer. A Likert-type symptom distress scale was used to record the women's perceptions of the therapy. An improvement was reported in five out of six mood variables including tiredness, tension and tranquillity. However, the small sample size and lack of formal controls severely limits the extent to which such findings can be generalized to other settings.

There is also a lack of sound evidence regarding the appropriate use of aromatherapy in health care settings. Several anecdotal accounts have been reported recently in the nursing press, each of which has claimed benefits for patients (Wise 1989, Passant 1990, Tattum 1992). However, whilst offering interesting insights onto the range of applications of this intervention, such uncontrolled observations do not provide a means of systematically evaluating a relatively new nursing therapy which may have the potential to do harm as well as good.

THE STUDY

In an attempt to evaluate the effectiveness of aromatherapy and massage used in the nursing care of patients in an ICU, a randomized controlled trial was designed using

physiological, psychological and behavioural measures of outcome.

The study took place in the ICU of a busy district general hospital during a 14-month period between May 1989 and July 1990. Patients who had sustained head injury, were known to be hypersensitive to perfume or had skin allergies such as dermatitis or eczema or who were unable to read or write English were not eligible for inclusion in the trial. Recruitment took place within 24 hours of admission to the unit.

The participant's consent (or that of the patient's nearest relative) was sought prior to recruitment and randomization. Following consent each patient was randomized to receive one of three treatment schedules:

- 1 body massage;
- 2 aromatherapy;
- 3 undisturbed rest.

As the mean length of stay of patients in the ICU was 5 days, patients received a minimum of one and a maximum of three sessions of the allocated therapy within this 5-day period. Each therapy was separated by a period of 24 hours.

Prior to commencement of the trial, six members of the nursing team undertook training in massage and aromatherapy techniques by a qualified aromatherapist who was also a qualified nurse. The therapist was also responsible for assessing the skill levels and proficiency of the nurses. This was achieved by each nurse performing the standardized massage technique on the therapist. Details of the three therapies are given below.

Massage

A period of massage was conducted using a standardized technique of light effleurage strokes performed on diffusely innervated areas of the body as available to the therapist, e.g. back, outside of limbs, scalp. The period of massage continued for minimum of 15 minutes to a maximum of 30 minutes. Grapeseed oil was used as a lubricating medium.

Aromatherapy massage

The massage was performed as above, but the lubricating medium was aromatic essential oil of lavender (*Lavendula vera*) diluted to 1% concentration. The same supply of oil was used throughout the trial.

In both aromatherapy and massage groups, verbalization was minimized to a level that enabled the therapy to be conducted safely: conversation was therefore limited to responding rather than initiating contact.

Undisturbed rest

The bed was screened to allow the patient undisturbed rest for a minimal period of 30 minutes. The patient was informed before the rest period that although they would be undisturbed, they would continue to be observed by the allocated nurse. Intervention and disturbance by medical staff, nurses and visitors was minimized during this time.

Ethical considerations

Considerable attention was paid to this aspect of the study as the staff were acutely aware of the distress experienced by both patients and their relatives. As the majority were admitted as emergencies it was not always possible to prepare patients in advance of admission to the unit. Great care was taken to explain the precise nature of the trial to potential participants who were conscious and to their closest relative when they were unable to respond. They were assured that refusal to participate would not jeopardize their care in any way. Written information describing the nature and conduct of the study was also made available. Nursing staff were freely available to discuss aspects of concern related to the trial. Patients and their relatives were given 24 hours in which to consider participating in the study prior to giving formal consent. The study protocol was approved by the Research and Ethics Committee for the West Berkshire Health District.

Sample size

It was estimated that the proportion of patients experiencing anxiety was likely to differ by 30% between the control and the treatment groups. To achieve 90% power in identifying such a difference as being significant at the 5% level, 35 patients were required in each of the treatment groups. The overall minimal sample size was therefore pre-set at 105 subjects.

Randomization

Consecutively numbered, opaque, sealed envelopes contained the random allocation to one of three therapies. The opening of the envelope signalled the irrevocable entry of a patient into the trial for the purpose of analysis, as this minimized selection bias. Pre- and post-therapy assessments were conducted by a nurse who did not take part in the care of that individual patient. Once the observations were completed, the data sheet was filed away from the clinical area so that it was not available for reference following completion of the treatment. Thus every attempt was made to minimize observer bias and to blind assessors to the actual therapy administered.

The following principal outcome measures were recorded both before and after each therapy session.

Physiological assessment

The physiological variables measured were systolic and diastolic blood pressure, heart rate and rhythm, and respiratory rates. The majority of patients in an ICU receive frequent monitoring of their vital signs; these are often continuously recorded via pressure transducers which transmit directly onto bedside monitors. Patients being ventilated have the number of spontaneous breaths and controlled breaths displayed separately. Objective and accurate recordings were therefore readily available without increasing the workload of staff or unduly disturbing the patient. Where physiological assessment utilized electronic monitors, the equipment was calibrated before the pre-treatment assessment recordings and recalibration did not occur until after the post-treatment recordings were completed.

Behavioural assessment

This was scored using a modified assessment tool developed specifically for intensive care patients who are unable to respond verbally (O'Brien & Alexander 1985). This included both positive and negative responses based on a range of observable behaviours, including motor activity, somatic changes and facial expressions. The range of behaviours was categorized into a four-point scale, which the nurse used to assess the response of conscious patients. The validity and inter-rater reliability of this tool were tested by asking eight nurses to independently observe three specific patients and complete the assessment score for each. There was good agreement in their scoring. This exercise was repeated on three successive shifts with similar results. The neurological status of unconscious patients was recorded using the Glasgow coma scale (Teasdale & Jennett 1974).

Patient assessment

Conscious patients, able to respond, used four-point scales to assess their level of anxiety, their mood and their ability to cope with their present situation. The terms selected for inclusion on the scale attempted to recognize the limited attention span likely to be experienced by the majority of *critically ill patients*. *Patient responses were completed immediately before and following each therapy and other interventions were kept to a minimum during this period.* In addition patients were invited to make any other comments they wished.

A pilot study was conducted on 30 patients to test the reliability and validity of the final assessment tool.

RESULTS

A description of patients in each of the three groups is given in Table 1. The youngest patient was 2 years and the

Table 1 Descriptions of groups at trial entry

	Massage (<i>n</i> = 43)	Aromatherapy (<i>n</i> = 41)	Rest (<i>n</i> = 38)
Male	25	19	25
Female	18	22	13
Mean age in years	64	55	61
Mean duration of therapy during 3 days (in minutes)	17	16.5	35

oldest 92 years. Overall 122 patients entered the study, 64.5% of those eligible who were admitted to the unit. Of the remaining 67 who were not recruited, 53 spent less than 24 hours on the unit, the majority for elective procedures such as insertion of tunnelled feeding lines or epidurals. Consent was not sought from 11 patients because either next of kin were not available or because of language difficulties, or because their distressed condition made it inappropriate for them to be approached to participate in the study. Of the 122 patients initially entered in the trial, 111 received their allocated therapy (90% compliance). Of these patients 54% (*n* = 66) received all three periods of therapy; 20% (*n* = 25) received two therapy sessions; 16% (*n* = 20) received one session only.

Eleven patients died or were transferred from the unit before treatments could commence. The main reasons why patients did not complete the treatment schedule were because the patient was transferred from the unit or died.

The mean duration of therapy during the 3-day periods was similar in the massage and aromatherapy groups (17 and 16.5 minutes); however, the mean period of rest received by those allocated to this policy was longer (35 minutes). This was because at the end of the 30-minute rest period patients who appeared to be sleeping were not disturbed for post-therapy assessment until they awoke spontaneously.

Table 2 Physiological assessment

Session	Treatment	No. of patients	Systolic BP (mmHg)	Heart rate	No. of breaths per minute
1	Aromatherapy	36	2.8	2.4	1.6
1	Massage	39	2.2	2.9	0.1
1	Rest	36	0.4	-0.4	0.8
2	Aromatherapy	29	0.4	2.2	0.0
2	Massage	32	2.0	1.7	0.7
2	Rest	30	-2.7	-0.3	-0.5
3	Aromatherapy	21	0.2	-4.8	-0.1
3	Massage	23	0.5	2.1	1.1
3	Rest	22	4.7	0.8	-1.4

Negative values denote an increase in the measurements following treatment.

During massage and aromatherapy sessions the most frequently treated areas of the body were the legs and arms, followed by the back and shoulders. The hands and feet were treated least frequently: two sessions involved treatment to the scalp and back of neck.

Overall there were no statistically significant differences in the physiological stress indicators following treatment in any of the three groups of patients in any of the treatment periods. Neither was a significant cumulative effect demonstrated at the end of the three therapy sessions.

Analysis of physiological variables

The mean difference in the values of systolic blood pressure (BP), heart rate and the number of spontaneous breaths before and after treatment (calculated as before-after) is given in Table 2 for each combination of treatment group and session.

In the first session, there was some suggestion that aromatherapy and massage reduced both systolic BP and heart rate, although the effectiveness of the treatment was not so clear for patients receiving rest alone. For treatments received in the second and third sessions the effectiveness of the therapy remained less marked. Differences between the mean response before and after treatment for each session and treatment combination were assessed using the *t*-test. In no instance was the *t*-statistic significant at the 10% level.

Analysis of behavioural scores

The behavioural scores recorded on the four-point scale were compared before and after therapy in each session. After treatment the vast majority of patients in each session remained in the same behavioural category as before treatment. This particular response variable therefore provided little information about the relative merits of the three therapies.

Analysis of psychological assessment

Of the patients who received one or more therapies, 84 (76%) were at a cognitive level which enabled them to complete this assessment, which included their reported levels of anxiety, general mood and their ability to cope with being in ICU. From these data the proportion of patients in each of the three treatment groups and each session who showed an improvement in their reporting was calculated. The resulting percentages are given in Table 3.

For each session and each response variable, a chi-squared test was used to compare the proportions improving between the three treatments. The difference between the proportions of patients in the three groups whose reported level of anxiety improved in the first session was significant at the 5% level ($P=0.05$). This difference was due to there being greater proportions of patients whose anxiety improved for aromatherapy compared to rest.

There were no treatment differences in the proportions of patients registering an improvement in anxiety level in the other two sessions. Neither were there any significant differences in the proportions whose mood or coping ability improved in any session.

The technique of linear logistic modelling (Collett 1991) was used to determine if there were treatment differences after allowing for age and sex differences amongst patients. The results of this analysis were very similar to those from the analysis described above, so fuller details are omitted.

DISCUSSION

Although every attempt was made to maximize recruitment to the study, the numbers who were not recruited highlight the difficulties of conducting trials in ICU where the circumstances of admission are so traumatic. Moreover, the duration of stay is extremely unpredictable and considerable influenced by decisions relating to the demand for

intensive care facilities. It was for this practical reason that patients in the trial were offered a maximum of three treatments only, as few remain for longer periods of time. In this trial the majority of patients received at least two therapy sessions, more than half receiving all three sessions.

The study did not differentiate between the possible effects of the aromatherapy oil by mode of use, i.e. through inhalation or by application to the skin. Many patients in ICU experience a distorted sense of smell due to the presence of nasal or oral tubes, drugs, etc. Prior to recruitment the patient or nearest relative was informed of the use of lavender oil to ensure that no-one who participated in the study was knowingly averse to the smell of lavender. Nevertheless the response of the individual to a particular smell or its association with past events should always be considered in any study involving aromatherapy.

The study demonstrated that the condition of the patient was not destabilized as a consequence of any of the interventions. This consideration is obviously of prime importance when caring for those who are critically ill. The physiological observations failed to demonstrate an improvement in vital signs, which may have provided an indicator of reduced anxiety levels. However, it is also acknowledged that small fluctuations in a patient's vital signs are to be expected even under normal conditions.

Rest

Rest proved as effective as massage in reducing reported anxiety and improving mood, and as good as aromatherapy in patients reporting improvements in their coping ability. This finding has implications for practice, as ensuring that patients are allocated periods of good quality rest is something that most nurses can safeguard: this should be regarded as a positive treatment.

The 1% concentration of lavender oil used in the study was at the lower end of the range of recommended dilution. This was in recognition of the critical condition

Table 3 Percentage of patients whose psychological assessment improved as a result of treatment

Session	Treatment	No. of patients	Response variable		
			Anxiety	Mood	Coping
1	Aromatherapy	36	72*	56	50
1	Massage	39	59	49	46
1	Rest	36	44*	42	42
2	Aromatherapy	29	76	69	55
2	Massage	32	69	56	41
2	Rest	30	67	60	57
3	Aromatherapy	21	70	55	45
3	Massage	23	65	43	39
3	Rest	22	50	45	36

* Statistically significant, $P=0.05$, $\chi=5.73$, 2 d.f.

of the participants. It is possible that 2% concentration may have produced more beneficial effects. Other essential oils also remain to be tested in clinical settings. At the time this study was conducted there were no male members of the nursing team, consequently all massage sessions were conducted by female staff. The gender of the nurse raises interesting issues regarding the response of patients to massage treatments.

Patients' comments reported following each session provided an insight into their experience of the treatment and of ICU in general. Although detailed analysis was not performed, responses covered a range of issues including positive or negative feelings about the therapy and ICU, comments relating to their state of relaxation and those concerned with their body image or self-esteem. Examples include:

I wouldn't have thought anyone would want to touch me like that [massage].

It [aromatherapy] made me feel clean and a whole person.

The rest period was not long enough.

These types of issues remain a rich source for further research.

CONCLUSION

This study has formally evaluated the effects of massage and aromatherapy for one group of patients nursed in a general intensive care setting. The evidence suggests that massage may offer a useful therapy for nurses to consider when planning the psychological care of such patients. The addition of 1% essential oil of lavender appears to enhance the effects of massage and may help contribute to the patients' emotional well being. Ensuring that patients in ICU have periods of undisturbed rest would also appear to be beneficial.

The results of this study cannot be generalized to other settings, such as care of elderly or mentally ill patients, or neonatal care. However, the findings raise a number of interesting issues for nurses to consider when planning care for critically ill patients. It is important that nurses continue to evaluate the effects of complementary therapies through well-designed studies using appropriate research methods, in order to ensure that patient care is based upon sound evidence rather than in response to current trends or fashion.

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