ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 11, Issue, 08, pp.5981-5986, August, 2019

DOI: https://doi.org/10.24941/ijcr.36332.08.2019

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

EFFECT OF MUSIC THERAPY ON PSYCHOLOGICAL OUTCOME IN ICU'S PATIENTS: A NARRATIVE REVIEW

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ARTICLE INFO

Article History:
Received 28th May, 2019
Received in revised form
20th June, 2019
Accepted 24th July, 2019
Published online 31st August, 2019

Key Words:
Music therapy, Pain, Anxiety, Stress, Depression, Intensive Care Units, Patients.

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ABSTRACT

Music therapy is one of the complementary therapies which not only delights our mind but also delivers immense relief to the body. The selective use of music therapy is a simple practice without any unwanted collateral effects on the patients during the treatment of the most other variables and reduces a considerable amount of anxiety, pain, stress and depression in Intensive Care Units.

***Citation: Kaur Jaskirat and Sharma Preksha,* 2019.** "Effect of Music Therapy on psychological outcome in ICU's patients: A Narrative Review", *International Journal of Current Research*, 11, (08), 5981-5986.

INTRODUCTION

Intensive care unit (ICU) is a specified area in a hospital designed to manage critically ill patients whose vital functions of the body are impaired and require special medical, nursing and technological support. It is an emerging specialty and all other sub-specialties merge to deliver comprehensive care and facility to the patients. Continuous positive researches are carried out to uplift the standards of treatment and care of the patients admitted in the intensive care units. The survival rates have also successfully improved as a result of various researches and their applications into practice. A positive intensive care process could enable the physical and psychological well-being of patients after the discharge and prevents a negative change in the quality of their lives.

Problems faced by ICU patients during admission and different modalities to alleviate them: The intensive care unit (ICU) is completely different from other departments in the hospital in terms of the modes of treatment and technical equipment used, physical appearance, and the nature of the sensitive environment.[1] When the important functions of patients decline in a very risky manner, they need to receive treatment in an intensive care unit to maintain vital functions and apply special treatment methods (Aslan and Ozer, 2010).[2]

The patient in these units experience changes in their comfort level, sleep pattern, daily lifestyle and also face numerous hurdles to reach back to the same state of health. The majority of ICU patients are admitted due to unanticipated and life-threatening disorders or deformities, severely impacting their early physical and psychological recovery. Whereas the ICU survivors further suffer from considerable long-term complications from critical illness and long ICU stay mostly associate with psychological problems (Rattray, 2005). Physical problems such as acute to chronic pain are experienced by the ICU clients due to any surgery, major trauma and serious medical illness requiring invasive monitoring and even mechanical ventilation. It lengthens their hospital stay and attracts more difficult situations for them (Jun-Mo Park, 2014). Along with that the routine medical and nursing care procedures like sample collection, dressing, suctioning and many others exaggerate the throbbing state of the sufferers present in critical units. Intensive care needing patients had already faced different miserable conditions and situations involving one or more organs. Some of the common reasons include:

- any serious accident – as any road accident, head injury, severe burn or serious fall
- a vulnerable short-term condition – such as acute MI or a CVA

- Infectious conditions – such as blood poisoning or severe pneumonia
- Major surgery –planned or an emergency measure if there are complications (https://www.nhs.uk/ conditions/intensive-care).

Many times more sensitive and delicate situation arises and the real cause of admission remains aside as the new complication came into existence becomes the supreme problem. As a result of the duration of hospitalization also extends. It is more critical for not only patient but also for the caretakers and family members. The patient gets surrounded with intravenous lines, infusion pumps, tubing such as feeding tubes, catheters and drains all around which further complicate the case. The present article reviews the patient problems and effectiveness of various interventions along with key measures of using music therapy on the critical unit patients. On many occasions, the patients want to express their feelings and ventilate the conflicting thoughts which keep on disturbing them throughout the day and thus create a hindrance in the regular treatment pathway. The problems could be due to the patient or due to certain environmental factors that are imparting a consistent effect on their physical and psychological health status. Most of these complicating conditions are noticed when the situation becomes more critical to handle therefore, the treatment process and hospitalization of the victims prolongs. Some of such complications include the followings:

PAIN: Pain is considered as the fifth vital sign and currently, medical professionals are more aware of the importance of management of a wide variety of pain symptoms in their patients, and their level of interest in research on pain management strategies have enlarged. Patients admitted in intensive care unit (ICU) are vulnerable to chronic pain as a result of various causes such as any surgery, major trauma and serious medical illness requiring invasive monitoring and even mechanical ventilation (Payen, 2009; Hamill-Ruth, 1999).

These patients are in greater need of appropriate pain management, compared with general ward patients. However, sometimes the pain and related symptoms remain unidentified and medical professionals may seek difficulty in evaluating them due to which it is often undetected or underestimated in many cases (Drayer, 1999). As the ICU patients have limited ability to communicate, therefore difficulty in faced to identify and evaluate pain among them. It is even more complicating and challenging in intubated ones. Payen et al. detected that accurate assessment of pain was made in less than 40% of total mechanically ventilated patients (Payen, 2009). Additionally, if the persistent uncontrolled pain is not managed appropriately may end up to most serious outcomes as post-traumatic stress disorder. The physiological reactions to uncontrolled pain are tachycardia, diaphoresis, anxiety, and catabolic metabolism and combined with elevated cardiovascular oxygen consumption, reduced gastrointestinal motility, tachypnea, and sodium and water retention. Moreover, the functional impairment may occur as a result of pain-induced respiratory dysfunction and failure of early ambulation, resulting in poor patient outcome and increases mortality risk.[9] Regular pain assessment of ICU patients results in improved clinical outcomes, and the clinical practice guidelines of the Society of Critical Care Medicine (2012 SCCM guideline) also strongly recommend its implementation (Barr, 2013). Various Pain scales such as visual analog pain scale (VAS) and numerical rating pain scale (NRS) are used to the measure intensity of pain among patients with self-report abilities (Breivik, 2008). The 2012 SCCM guidelines also recommend the Behavioral Pain Scale (BPS) and Critical-Care Pain Observation Tool (CPOT) as valid tools for accurately assessing pain (Barr, 2013). There are numerous pharmacological therapies to treat and relieve pain among ICU patients and the pharmacologic drugs should be chosen on the basis of their properties and hypersensitive reactions in patients. The recommended IV opioids such as fentanyl, morphine, methadone, and remifentanil act as the first-line treatment for non-neuropathic pain in adult ICU patients as they are more potent and have minimal sedative and anxiolytic effects. The atypical analgesics are also recommended or IV opioids can be replaced by epidural analgesia, whereas other peripheral nerve block techniques or complementary non-pharmacologic interventions are also actively applied. The complementary therapies such as therapeutic touch (TT) promote relaxation and pain reduction. The alternative treatment modalities of pain management like transcutaneous electrical nerve stimulation (TENS), acupuncture and aromatherapy are having weak evidence based pain management in intensive care but should be considered as the adverse effects are relatively low.[12]

Effect of music therapy on pain: In contrast to other complementary therapies, music therapy is found to be effective in relaxing the patients by relieving their pain. Hatice *et al.* concluded in a study on ICU patients where music therapy reduced the mean score of the Visual Analogue Scale (VAS)from 2.3 to 2.0 throughout the half-an-hour relaxation period to 0.7 after therapy. A statistically important relationship was found among the VAS scores in the initial assessment, during the half-an-hour relaxation period, and after taking note of music ($p<0.05$) (Hatice Çiftçi, 2015). In another study, Jamie Marie Besel proved that music therapy delivers comfort to patients and reduces pain intensity. She found that mean comfort scores elevated from86.0 to 91.0 in pre-intervention to post-intervention periods whereas the pain scores dropped from 5.33 to 4.44 following the intervention, but increased from 3.33 to 4.78 following the control group.[14]Whereas, Fariba Yaghoubinia et al. conducted a randomized clinical trial to determine its effect on pain in unconscious patients by providing the therapy for three days. She analyzed that the mean change in pain score showed a significant difference in two intervention and control groups in three consecutive days ($p < 0.0001$) (Fariba Yaghoubinia, 2016). Many such studies are available which exhibits its effectiveness over pain.

Psychological Alterations: The intensive care unit (ICU) environment and treatment plans are both stressful and psychologically traumatic for admitted patients. They frequently acquire many mental health disorders during their care process in ICUs including stress, anxiety, depression and posttraumatic stress disorder (PTSD). Mostly these sign and symptoms are ignored by medical professional which are later followed by alarming outcomes. It is also reported that prolonged stay in ICU could lead to an adverse psychological sequel on patients which lasts longer even after the discharge or physical recovery (Jones, 2003). Therefore stress, anxiety, depression, and PTSD could greatly affect the quality of life among patients following recovery period in ICUs. Living or dying is dependent on technical interventions applied by the skilled health team. However, the critical illness has a great impact on the whole individual- comprising mind, body, and spirit.

Table 1. Diagnostic tools for anxiety and depression

S No.	Anxiety	Depression
1.	Depression anxiety Stress Scales (DASS)	Depression anxiety Stress Scales (DASS)
2.	Generalised Anxiety Disorder Questionnaire-IV (GAQIV)	Hospital Anxiety and Depression Scale (HADS)
3.	Zung Self Rating Anxiety Scale (ZSAS)	Patient Health Questionnaire- 4
4.	Hamilton Anxiety Rating Scale (HARS)	Patient Health Questionnaire- 9
5.	Beck Anxiety Inventory (BAI)	BDI-II (Beck Depression Inventory)
6.	Visual Facial Anxiety Scale (VFAS)	
7.	Overall Anxiety Severity and Impairment Scale (OASIS)	

The psychological and spiritual variables have a significant impact on the outcomes in physically compromised and vulnerable patients (Linda, 2017).

Stress and Post Traumatic Stress Disorder (PTSD): The intensive care units are intended to treat patients of a medical specialty or the sufferer of diseases or conditions, such as cardiac, neurological, surgical and traumatic, among others. However, despite being an environment with complex technological apparatus aimed at better patient care, most ICUs are environments that generate stress (Manpreet Kaur, 2016). Some triggers include lack of natural light, disruption of sleep-wake patterns, absence of clocks and lack of contact with family and friends, in addition to the several clinical procedures that cause patients to experience different types of physical and psychological discomfort (Biancofiore, 2005). Stressful conditions may trigger an inflammatory response in the brain and other systems, which is characterized by the complex release of inflammatory mediators. This response can exhibit different symptoms that depend on the intensity and quality of stressors. The stressors of critical illness are so numerous and severe that people become overwhelmed. In a review article by Mette Ratzeret. al. the prevalence range for PTSD/PTSS post ICU from the 38 articles ranged from 0% to 52% with a mean prevalence rate of 17% (n=7943) (Mette Ratzer, 2014).

The commonly observed stressors for critical care unit patients: Thanatophobia (Fear of death), Uncertainty about future and fear of permanent health deficits, pain, discomfort and physical restrictions, lack of sleep, loss of autonomy and control over one's body, privacy and daily activities, unfamiliar environments, worry about finances, job loss and stress of loved ones, separation from family, friends, social roles and workplaces, loss of dignity and a sense of vulnerability, loss of ability to express oneself when intubated. There can be a presence of more than one stressor which terminates with critical outcomes among the patients. In a research study, Cornock concluded that thirst was the most common stressor and the presence of tubes in the mouth and nose was the second most common stressor among the ICU patients (Cornock, 1998). Cochran and Ganong stated that the presence of tubes in the mouth and nose was the most disturbing stress factor for patients as they cannot overcome the situation individually (Cochran, 1989). On the other hand, the risk factor for inducing PTSD comprise of demographic factors such as young age, female gender and low educational status, and health history factors include illness severity, ICU length of stay, length of mechanical ventilation, TBI, use of stress hormones and sedatives, previous history of depression and delirium (Kaur Manpreet, 2015).The process of coping mechanism plays a mandatory role in adapting, adjusting and successfully meeting the life stressors. Each patient's response is unique and depends on a variety of environmental factors and individual differences.

Effective coping mechanisms help the patient to maintain an acceptable degree of control and empower to take necessary actions, use healthy denial and manage troublesome challenges and uncertainties (Fariba Yaghoubinia, 2016). In case the patient possesses ineffective coping strategies may end up with unpredicted outcomes and is characterised by inappropriate use of defence mechanisms, verbalisation of inability, anxiety, unable to meet basic needs, and limited problem-solving abilities. Not only this, the patient may also display destructive behaviour towards self and others. Whereas, patients with PTSD repeatedly experience the trauma, which can be of such intensity that they lose contact with their current surroundings (Halter, 2016). Nightmares of the trauma are common. Avoidance of stimuli likely to remind the patient of the trauma includes avoiding conversation, places, people and activities associated with the trauma. There can be hyperarousal too (e.g. difficulty with sleeping, concentration, and irritability). This crucial situation can be tackled in a systematic manner. Attention to the whole patient is the ultimate goal of the health care professionals and is vitally important for critical care patients. As it was rightly believed by Nightingale that "It was unthinkable to consider sick humans as mere bodies who could be treated in isolation from their minds and spirits (Nightingale, 1969)".

Various psychosocial skills can be applied to relax the patients, such as generating therapeutic relationships, respect their dignity, collect consent and feedback periodically, developing a trustworthy environment, helping the patient to cop-up with loss and respect their spiritual and religious beliefs too (Fariba Yaghoubinia, 2016). Certain pharmacological drugs are also available to reduce the symptoms of stress and PTSD including CNS depressants, such as barbiturates, benzodiazepines, for long-term anti-anxiety and antidepressant drugs can be used. Other prescribed drugs with sedating effects as antihistamines and sleep-inducing medications are commonly used (Jason, 2002). There are numerous complementary therapies available that can re-establish a balanced state. The practice of ICU diary writing is very effective and it can be continued even after their discharge. They are also used to help patients remember their ICU experience and fill memory gaps (Bergbo, 1999). Others like spiritual care, massage therapy, therapeutic touch also play a vital role (Alham, 2015; Tak, 2016; Valerie Eschiti Healing Touch, 2007). Psychological support via various means like Relaxation therapy can also be applied which not only reduces the stress but also induces sleep and satisfaction among the patients as studied by Elizabeth DE (Elizabeth, 2010).

Effect of music therapy on stress and ptsd: As it is rightly said that music exhibits the power to enhance the well-being, as it reduces stress and distracts patients from unpleasant symptoms due to which it is greatly utilised by health care personals in patient management. Music therapy is one such intervention that has shown to modulate stress and promote

relaxation. According to Chlan et al., 2007 it can ameliorate the stress response in mechanically ventilated patients over time (Chlan, 2007). Whereas Bradt, et al., 2010 stated the exhibition of positive effect on physiological indices of stress including heart rate, arterial blood pressure and respiratory rate be reduced by acute treatment (Bradt, 2010). Music therapy also has the potential to improve the mood of medical and surgical patients and is applicable for almost all patients in intensive care units or those who are undergoing procedures. Many evidences show music therapy is efficacious in reducing anxiety and physiological indices of stress too.[34] Therefore it can also be prescribed therapeutic purposes.

Anxiety and/or Depression: Human beings everyday activities are full of worries and tensions. Whereas mild to moderate anxiety can help you focus your attention, energy, and motivation whereas marked to severe can be threatening.
Anxiety is the emotional state of the human beings that is characterized by subjectively perceived feelings of tension and apprehension. It over stimulates the autonomic nervous system activity. There are numerous causative agents but most of the time they remain unknown. It does not have any age restriction for its exhibition as it is presented by almost all age groups. The manifestations may be abrupt or slow with veracity and mainly includes palpitations, trembling, shortness of breath, chest pains, nausea and vomiting (Spielberger, 1983). Anxiety mainly has two types of symptoms: physical and emotional. Mostly they are short in presentation when the condition passes on the symptoms usually vanishes. The physical manifestations are trembling, twitching, or shaking, feeling of fullness in the throat or chest, dyspnoea or tachycardia, light-headedness, sweating or cold and clammy hands, muscle tension and aches, extreme tiredness and sleep problems, such as the inability to fall asleep or stay asleep, early waking up, or restlessness during sleep (Spielberger, 1983). It affects the part of brain that controls communication power.

The emotional expressions of anxiety include: restlessness, irritability, or feeling on edge or keyed up, worrying too much, fearing that something bad is going to happen or feeling doomed and inability to concentrate. Typical behavioral symptoms include: avoidance of situations or places and escaping from them, engaging in unhealthy, risky, or self-destructive behaviors to overcome anxiety, refuse to go out, away from home, to school, or to work to avoid separation (Renu Bala, 2019). The ICU environment is different from all other departments in terms of treatment methods, technical equipment, physical appearance, and nature of sensitivity. Whenever any vital function of patient declines, immediately they are shifted to ICU for applying special treatment methods which are needed (Aslan and Ozer, 2010). Theyexperience a change in their comfort levels too. Various reasons that enhance the anxiety level constitute pre-preparation of surgical procedures, intubation, and ventilation; changes in the environment; and movement restriction caused by the existence of invasive and non-invasive tools as stated in research studies. Other invasive routine procedures performed on the patients who stay in hospitals or long-term care facilities during their hospitalization may also heighten their anxiety such as routine blood samples, intravenous infusions, urinary catheter insertion to more complex procedures such as chest tube or central line insertion. The act of performing such invasive procedures could induce significant levels of anxiety among the receivers which further leads to a delayed response to care and treatment. (Leach, Tanner & Zernicke, 2000). Depression is also approaching as a clinical feature of patients admitted in critical units. It is significantly more common than symptoms of PTSD and is characterized by weakness, appetite changes and intense fatigue—all signs of somatic or physical depression are seen in two-thirds of the patients, as opposed to cognitive symptoms such as sadness, guilt or pessimism (Robert Hatch, 2018). There are various diagnostic tools to identify the presence of anxiety and depression. Some of them which are generally applied on ICU patients are enlisted in the Table no. 1 (Tools for anxiety assessment). It is very much necessary to manage ICU anxiety and depression to overcome critical psychological outcomes. The pharmacological treatment available for managing and rehabilitating the health status is mainly classified in four classes of medications such as selective serotonin reuptake inhibitor (SSRI), serotonin-norepinephrine reuptake inhibitor (SNRI), tricyclic antidepressant, and benzodiazepine. The dosage and duration of treatment is altered on the basis of age, gender, symptoms and adverse effects (Linda, 2017). On the other hand, innumerable complementary therapies and alternative medicines are available to subside these problems. Some of them include- herbal interventions, nutritional supplements, massage, and aromatherapy. Cognitive interventions like Mindfulness-based stress reduction (MBSR) can be used which combines of mindfulness meditation, body awareness, and explores patient's behaviour, thinking, feelings, and actions (Gill van der Watt, 2008). Regular interviews can also be planned to lighten their anxiety and it prevents depression too. The development of a calm and therapeutic environment may also help.

Effect of music therapy on anxiety and depression: Music is a therapeutic aid that influences the physiologic, psychologic, and emotional integration of the individual during the treatment of an illness or disability. Multiple studies have shown fruitful results of therapy on anxiety and depression among ICU patients. As Wong et al. (2001), concluded that music therapy is effective in mechanically ventilated patients it lowers anxiety and also maintains their physiological parameters (Wong, 2001). Chan et al., observed in a randomized study on 47 people (<65) that, in case of the music group, there was a statistically significant reduction in depression scores ($p<0.001$), blood pressure ($p<0.001$), and heart rate ($p<0.001$) after 1 month ($p<0.001$). This observation implies that music therapy is effective for elderly patients too (Chan, 2009).

ICU Psychosis and Delirium: The patients admitted in an intensive care unit (ICU) may become delirious, even though it is a temporary condition but demands special attention by the health team.ICU psychosis is a disorder in which critical patients in an ICU or a similar setting express serious psychiatric symptoms. It is also named as ICU syndrome and is a form of delirium. It is becoming a prevalent problem and may occur at any time during recovery from an acute illness or traumatic event while the patient is present here. It requires some necessary efforts to relieve ICU psychosis. Mostly the signs of psychosis resolve shortly after the patient gets discharged from ICU. It mainly lasts for 24 hours after ICU admission but may extend up to two weeks in exceptional cases. There are various causative agents of ICU psychosis but mainly comprises of environmental factors such as sensory deprivation, sleep disturbance, and deprivation, feels stress and losses total control over their life, disoriented to time, place and date.

Whereas, medical causes are intense pain, critical illness or traumatic event, drug reaction or exaggerated side effects of medications, intense fever and infection in the body, metabolic disturbances, dehydration, and heart failure (Timothy, 2008). The manifestations comprise of extreme excitement, anxiety, restlessness, hearing voices, clouding of consciousness, hallucinations, nightmares, disorientation, agitation, delusions, abnormal behavior, fluctuating level of consciousness which include aggressive or passive behavior. In short, patients become temporarily psychotic. The symptoms vary greatly from patient to patient. The diagnosis can be made only in the presence of best known underlying medical conditions that may mimic the symptoms of ICU psychosis. Advanced health assessment of the patient is necessary to search for delirium and it should be part of the ICU admission physical examination and should also be incorporated into the daily work plan.

Other reasons for mental status abnormality such as stroke, infection or sepsis, adverse drug interactions, hypoglycaemia, drug or alcohol withdrawal symptoms, and any other medical condition should also be assessed. It is necessary to maintain the patient's safety throughout the care process as he/she can be hyperactive (mostly hypoactive) (Fariba Yaghoubinia, 2016; Nightingale, 1969). Out of many the Critical Care Medicine (ACCM) Clinical Practice (2013) the Confusion Assessment Method-ICU (CAM-ICU) and Intensive Care Delirium Screening Checklist (ISDSC) are the most effective tools for its measurement**.** There are some techniques to prevent its development such as liberal visiting policies, providing adequate sleep, limit unnecessary excitement, minimise shift changes of nursing staff, regular orientation, reviewing all medical procedures with an explanation, ask for any questions or doubt, collecting history of religious and cultural beliefs, and coordinating the lighting with the normal day-night cycle. Attempts should be planned to manipulate the modifiable risk factors (Timothy, 2008). The pharmacotherapy for managing ICU psychosis or delirium includes sedatives with antipsychotic agents and haloperidol is the drug of choice (Nightingale, 1969). The conventional therapies applied for relieving it are all most similar to that of anxiety and depression.

Effect of music therapy on icu psychosis or delirium: Music therapy has various advantageous qualities that make it a viable intervention for the management of delirium with effectiveness in alleviating the symptoms. An RCT was performed by Sikandar H. Khan et al. to determine the effectiveness of therapy on delirium among critically ill and intubated patients (Sikandar, 2017). Various protocols were developed by hospitals to apply it to ICU psychotic patients in order to induce sleep.

Altered sleep pattern: Frequently it is noticed that the ICU patients face difficulty in sleeping and remain awake throughout night. Many times the healing environment creates a barrier and thus disturbs the sleep. The different alarms in ICU settings make noise which is mostly unbearable for clients. The WHO guidelines say minimal noise for hospital settings as 35 dB during day time and 30 dB at night. It may exceedupto55 to 65 dB in an ICU, but peak levels more than 80 dB are prohibited (World Health Organization, 2001). The presence of sharp lights also causes sleep deprivation. It deteriorates the health and alters hormonal levels. The condition can be solved by using diurnal lights to mimic day/night cycles and by avoiding harsh lighting during nights. The volume of alarms should be minimized to limit disturbance, if not possible then earplugs can be applied. Limit the interruption during sleep and provision of a comfortable bed is necessary. The vital monitoring during sleep can be monitor-based than manually. Providing massage also promotes sleep, as it relaxes whole body (Richards, 1998).

Effect of music therapy on altered sleep pattern: There are limited researches in this field. In a review article, Ellyn E. Matthews (2011) explained that music therapy acts as a valuable nursing intervention and may also support in inducing sleep in patients. It relaxes the mind by inhibiting its wandering (Ellyn, 2011). All the alarms and noises have a barrier of headphones for their entry. It promotes early healing and discharges too. But still, there are limited shreds of evidence present in the research field.

Conclusion

Music being a vast field of knowledge, patience, love, and beauty, therefore it has the potential to eliminate the problems faced by ICU patients and has the power to enhance the well-being, reduce stress, and distract patients from unpleasant to pleasant thoughts. Though there are wide variations in individual preferences, even then music appears to exert direct physiologic effects through the autonomic nervous system. It may also modify the caregiver's perception as a result of good communication.

Acknowledgement: Nil

Financial and Material Support: Self

Conflicts of Interest: None

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