

A review of the literature on the health benefits of *Salat* (Islamic prayer)

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ABSTRACT

Introduction: Recent studies explored the association between health and religious practice/spirituality. Several studies revealed that religious commitment and spirituality are generally associated with better health outcomes. Throughout the world, millions of Muslims perform *salat* (prayer) regularly five times a day. *Salat* is not only a physical activity but involves recitations of various Quranic verses and performance of certain postural positions. Several studies showed that *salat* does have positive effects on health status. This review aims to investigate the effects of Islamic *salat* on general health.

Methods: A series of searches were conducted of Medline databases published in English between 1966 and October 2020 with the following keywords: Prayer, *salat*, health, and Islam. **Results:** Several positive effects of *salat* on health were identified. These include: psychological, neurological, cardiovascular, and musculoskeletal effects.

Conclusion: *Salat* is a non-pharmacological intervention and resource, and may be included in the holistic care and rehabilitation program aimed at the well-being of patients.

KEYWORDS:

Prayer, Salat, Islam, Health benefits

INTRODUCTION

Over the last three decades there has been increasing medical interest in mind and body medicine.¹ Religion at large has always lent a useful guide to approach both the physiological illnesses and psychological maladies. Researchers at the Mayo Clinic reviewed 350 studies examining the influence of religion on the physical health of patients and 850 studies investigating the impact of religion on mental health. Most studies have shown that religious involvement and spirituality are associated with better health outcomes, including greater longevity, coping skills, and health-related quality of life (even during terminal illness) and less anxiety, depression, and suicide. They concluded that religion promotes illness prevention, coping with illnesses, and recovery.²

High levels of spirituality and religiosity are correlated with lower morbidity and mortality, enhanced quality of life and well-being, and lower levels of depression and psychological stress.³ Possible mechanisms by which spirituality and

religiosity may affect health outcomes include healthier lifestyles (e.g., healthy diets, less smoking and alcoholism, lower rates of stress and depression, optimism and hope, enhancement of social ties, lower rates of suicide and a more favorable immune profile.^{4,6}

Recent studies endeavored to explore the health effects of prayer from a scientific standpoint. In a survey of 4404 Muslim individuals, the investigators found that the participants who prayed regularly achieved better health, exhibited more favorable health-related behaviors and use of preventive services, and reported greater satisfaction with care.⁷ However, *salat* (Islamic prayer) is different from the personal prayer or invocation associated with the Christian faith. In Islam, that is called the "Du'a", or supplication, formal and informal.

Islamic prayer, commonly represented by the Arabic term *salat* is the second pillar of Islam. As an obligatory requirement of ritual worship, *salat* combines the essential tenets of Islam; worship of one God, remembrance of Allah, submission to the Allah's will, supplication, as well as, a symbol of unity of the Muslim community.^{1,8} *Salat* is performed at five appointed times during a day as commanded in the Quran, the Holy Book "Verily, *Salah* is an obligation on the believers to be observed at its appointed time" (Qur'an 4:10).

It is preceded by the ritual ablution (*wudu*) and it includes various postures (*raq'aas*) which involves standing, raising and lowering of arms, bowing, sitting on shins, prostration and head rotation. Voluntary prayers in addition to the above are highly encouraged and are recommended as a means of turning to divine help, especially at times of personal grief and distress.⁹

Regular prayer is emphasized more strongly in Islam than in Christianity and Judaism. While prayer is very important to devout Christians, it is usually carried out less than the five times per day as is required in Islam.¹⁰ The five times are dawn prayer (*Fajr*), noon (*Duhar*), early evening (*Asr*), after sun set (*Magrib*) and night prayer (*Isha*). The form of prayer is also different between the two faiths, whereas Muslims become involved with their entire bodies by standing toward Makkah, reciting verses from the Quran, kneeling and bowing (*Rokoo*), bowing down to the ground and touching it with their foreheads (*prostration, Sujood*).

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The Orthodox Jews also stand during their prayers and face towards Jerusalem, then they bow and finally stand up swaying their head forward and backward frequently and quickly. They don't prostrate to the ground, although it is mentioned in the Book of Daniel that Daniel prostrated down to the ground during his prayers. The orthodox Jews pray three times a day: early morning, afternoon and at night.

Several studies showed that *salat* has positive effects on the health status. The objective of this review is to investigate the current evidence of health benefits of *salat*, and discuss what is known regarding these effects.

Health benefits of Salat:

Psychological

Many patients encounter psychological and emotional distress in the face of illness and possible death. High levels of anxiety may worsen their physical condition. Several reports on the application of prayers in psychotherapy illustrate the positive outcome in an individual exhibiting pathological symptoms such as tension, anxiety, depression and anti-social tendencies.¹¹ Yucel¹² conducted a study, at Brigham and Women's Hospital, exploring the effects of *salat* and *Dua* (supplicative prayer), on sixty adult Muslims aged between 18–85 years. He found that *salat* reduced stress and depression while providing comfort and hope. Findings were consistent with prior studies on prayer-health relationship. The study also revealed that 75% of the participants indicated that Islam was an important factor in their lives. The mind and body relationship in *salat* may provide a basis for overcoming life's exigencies, decreasing anxiety and depression while relying on Divine assistance and guidance.¹²

In a study of 30 healthy Muslim men, Doufesh¹³ investigated the effect of Muslim prayer (*salat*) on the relative power (RPa) of electroencephalography (EEG) and autonomic nervous activity. During *salat*, a significant increase ($p < 0.05$) in the mean RPa in the occipital and parietal regions of the brain and a normalized unit of high-frequency (nuHF) power of HRV (as a parasympathetic index) were observed. Meanwhile, the normalized unit of low-frequency (nuLF) power and LF/HF of HRV (as sympathetic indices) decreased. The increased Electroencephalogram (EEG) occipital and parietal RPa during *salat* suggest that prayer produces positive changes in brain function and human well-being. These changes are associated with an increase in the parasympathetic component and a decrease in the sympathetic component in the autonomic nervous system (ANS). Therefore, regular *salat* practices may help promote relaxation, minimize anxiety, and might reduce cardiovascular risk.¹³

Meditation

Meditation is a practice where a person uses a technique, such as focusing the mind on a particular object, thought or activity to train awareness and achieve a mentally clear and emotionally calm state. Numerous studies have reported the benefits of meditation. Meditation may be a potentially attractive cost-effective adjunct to more traditional medical therapies.¹⁴ Almost all religions incorporate some form of meditation and the Muslim prayer is the meditation of Islam.

From the Islamic point of view, the prayer is not the goal itself. The real goal is the remembrance of God and the training of attention during prayer to focus on God ("... and keep up prayer for my remembrance") (Quran 20:14).

Studies have shown that *salat* results in the activation of parasympathetic nervous system, and a decrease in sympathetic activity.¹³ This may explain why *salat* is often considered as a form of meditation as it decreases anxiety and promote relaxation. The majority of studies on meditation reveals alpha rhythm slowing, and increased alpha rhythm coherence on the EEG. Doufesh et al.,¹⁵ investigated the concept of relaxation attained when performing the Muslim prayers by measuring the alpha activity in the brain. Nine Muslim subjects were asked to perform the four required cycles of movements of "*Dhuha*" prayer, and the EEG was subsequently recorded. Findings were similar to other studies revealing increased alpha amplitude in the parietal and occipital regions of the brain during meditation and mental concentration. The incidence of increased alpha amplitude suggested parasympathetic activation, thus suggesting a state of relaxation. More studies are needed to delineate the role of mental concentration, and eye focus, on alpha wave amplitude while performing acts of worship.¹⁵

Doufesh et al.,¹⁶ also investigated the difference of mean gamma EEG power between actual and mimic *salat* practices in 20 healthy Muslim subjects. In the actual practice of *salat*, the participants were requested to recite and perform the regular steps of *salat*; whereas participants mimicking *salat* practice were instructed to perform only the physical steps without Quran recitation. The gamma power during actual *salat* was statistically higher than during the mimic *salat* in the frontal and parietal regions in all stages. Increased gamma power during the actual *salat*, probably related to an increase in the cognitive processing, in keeping with the concept of *salat* as a focus attention meditation.¹⁶ Future research focusing on the medical benefits of *salat* should be conducted with an aim of educating Muslim physicians on *salat* as a form of mind and body medicine.

Meditation may be considered as an adjunctive to the guideline-directed cardiovascular risk reduction by lifestyle modification. Neurophysiological studies reveal that meditation may have long-standing effects on the brain.¹⁴

Achour et al.,¹⁷ examined how *salat* moderates the relationship between job stress and life satisfaction among 335 Muslim nursing staff in Kuala Lumpur, Malaysia. They found that job stress was associated negatively with life satisfaction. There was a strong positive correlation between *salat* and life satisfaction and *salat* helped in reducing the stress and might have improved the life satisfaction of these Muslim nurses.¹⁷ Physicians should consider incorporating more mind and body techniques in view of the dramatic increase in chronic stress-related disorders throughout the world.¹

Neurological

Beside the spiritual and religious aspects of prayer, *salat* is a repetitive and/or mentally enhancing activity. It involves both cognitive and motor components. Prostration (*Sujoud*) is

the only position in which the head is in a position lower than the heart and therefore, receives increased blood supply, which consequently, may have a positive effect on memory, concentration, psyche and cognitive function (the mental processes that allow us to carry out any task). There is only one study that examined the relationship between religiosity and cognitive function in Muslims. Inzelberge et al.,¹⁸ conducted a door-to-door survey of 935 Arabs in Palestine, men and women over the age of 65 years, examining the relationship between the number of praying hours per month during midlife and cognitive function. Of the 935 individuals who were approached, 778 [normal controls (n=448), Alzheimer's disease (n=92) and mild cognitive impairment (MCI) (n=238)] were evaluated. The results showed that 87% of cognitively normal persons practiced prayers at midlife, compared to 71% of those with mild cognitive impairment and 69% of those with Alzheimer's disease (AD) ($p < 0.0001$). The study found that prayer during midlife significantly reduced the likelihood of mild cognitive impairment over the age 65 in Arabic women in Palestine.¹⁸

Alabdulwahab et al.,¹⁹ compared the dynamic balance of 60 healthy male subjects who performed *salat* regularly with non-practising individuals using a Balance Master. They found that individuals who performed *salat* regularly had a significantly superior dynamic balance ($p < 0.05$) in terms of reaction time, movement velocity, end-point excursion, and directional control than the non-practising healthy subjects.¹⁹

Cardiovascular

Religious involvement is associated with less cardiovascular disease.² Islamic prayer is performed at least five times a day and consists of a series of movements entailing standing, prostrating and sitting. *Salat* maneuvers were equivalent to light exercise in terms of their physical exercise value. When performing prayer, the Qur'an discourages lazily performing prayer as performed by the Hypocrites; thus, a lethargic and careless approach to prayer neither obtains any spiritual nor physical benefit to the state of health. The physical movements during prayer with repetitive standing-sitting actions throughout the day may also help in preventing deep vein thrombi.²⁰

Doufesh et al.,²¹ reported the effects of the *salat*, on heart rate (HR) and blood pressure (BP) while performing and miming the actions of *salat*: standing, bowing, prostrating and sitting. Thirty Muslim subjects were asked to perform the actual and mimicking *salat*. HR was measured during actual and mimicked *salat*. However, BP was measured immediately before and 5 minutes after performance of both actual and mimed *salat*. There was a significant difference in the HR of the subjects performing and miming *salat*. The standing and prostration positions of *salat* produced the highest and the lowest HR, respectively. The systolic BP decreased slightly after performance (118.0 ± 5.6 vs. 115.0 ± 4.7 , $p < 0.05$) and mime of *salat* (119.3 ± 4.9 vs. 117.1).²¹

Religious involvement was associated with lower blood pressure. *Salat* is a type of meditation exercise and evidence shows meditation results in a decrease in both systolic and diastolic blood pressure, and thus might be of benefit to mildly hypertensive individuals.^{21,22}

Al-Kandari²² tested the blood pressure of 223 Kuwaitis and compared the blood pressure of those who pray to those who do not. He concluded that those who pray were generally found to have lower blood pressure. Al-Kandari noted that involvement in religious activities seemed to be a factor in lowering blood pressure as it provided a social support network.²²

Byrne and Price²³ pointed out that two of the most important functions of religion for human health are providing a sense of security and a source of strength extracted from an individual's social support network and from his/her religious community.²³ Steffen et al.,²⁴ also found that African Americans who engage in prayers and religious activities had lower blood pressure. Among African Americans with higher levels of religious commitment were associated with lower awake ($p < 0.05$) and sleep ($p < 0.01$) ambulatory blood pressure. Lower 24-hour BP load may be a pathway through which religious practice and cardiovascular health are related.²⁴ Further studies to explore the benefits of *salat* maneuvers for patients with cardiovascular diseases are warranted.

Musculoskeletal

Most of the muscles and joints of the body are usually involved in the performance of *salat*. This kind of activity will be convenient for most patients, including the elderly. Prayer may be considered as a type of stretching exercise. The physical activities performed during *salat* are simple and gentle exercises that are suitable for all ages and different conditions. During *salat*, the gentle muscle contraction and relaxation are done with harmony, resulting in flexibility of the muscles without over-exhaustion. A small study of seven adult subjects investigated the electrical activity of two muscles located at the dorsal surface (the erector spinae and trapezius muscles) during *salat* and showed that both muscles maintain a balance in terms of contraction and relaxation during bowing and prostration position.²⁵

Salat consists of at least two "rakaats", and each rakaat involves a series of seven postures. In the prayer performed before sunrise, 2 rakaats or 14 consecutive postures must be performed. Therefore, each Muslim is obliged to perform at least 119 postures every day, that is 3570 postures monthly, and 42,840 postures every year. *Salat* is considered obligatory at the puberty, and if someone lives up to an average of 60 years, a Muslim would have performed over 1,927,800 compulsory postures during *salat* in his lifetime.²⁶

The therapeutic aspects of *salat* in promoting psycho-physical well-being have been discussed by several authors and focused on the musculoskeletal benefits of *salat* which include maintenance of postural equilibrium, providing muscle tone, improving circulation, and may have protective role in reducing osteoarthritis (OA) of the weight bearing joints.²⁷⁻²⁹

The role of this repetitive action on knee and hip osteoarthritis and osteoporosis was explored. Forty-six patients who performed prayers for at least 10 years, and 40 patients who had not performed the prayer, were included in this prospective study. The authors concluded that the prayer had no negative effect on knee and hip osteoarthritis.³⁰

Chokkhanchitchai³¹ studied the effect of *salat* on both the prevalence and severity of knee osteoarthritis (OA) in a Thai elderly population with the same ethnicity but different religions. The study involved 153 Buddhists and 150 Muslims aged over 50 years. The prevalence of knee pain was significantly higher among Buddhists than in Muslims (67.1 vs. 55.8, $p = 0.02$). The prevalence of OA was lower in Muslims than in Buddhists. It is postulated that the Muslim way of praying since childhood, forcing the knees into deep flexion, may stretch the soft tissue surrounding the knees and decrease the stiffness of the articular cartilage.³¹

Rehabilitation

It is well known that even moderate intensity activities, when performed daily, can have some long-term health benefits. During different positions and transitions of *salat*, movement occurs at almost all joints of the body. *Salat*, with its various postures and movements, can play a role in increasing psychological well-being including the self-esteem, improving musculoskeletal fitness and cerebral blood flow that may be beneficial in the rehabilitation program of geriatric and disabled patients.²⁷

The practice of *salat* may help in the rehabilitation process in patients with neurological or musculoskeletal impairments as it involves minimum effort and promotes mental and physical health. Different postures of *salat* (standing, bowing, prostration and sitting) may play a role against the adaptive postures which the affected patients may adopt after suffering a neurological insult.³²

Salat is concluded by looking over one's right and left shoulder, during which, neck rotational movements take place. This might further contribute to neuromuscular fitness. These possible therapeutic effects of *salat* may suggest incorporating it in rehabilitation as a gentle exercise. More studies are needed to determine the full beneficial effects of the *salat* prayer on the rehabilitative process of disabled persons.

Benefits in specific conditions:

Cervical Spondylosis

Cervical spondylosis is a common, age-related condition that affects the joints and discs in the cervical spine, in the neck. The practice of *salat* may improve the strength of neck muscles. *Sala'm*, turning the head towards both shoulders at the end of *salat*, might be a limited gentle neck exercise. A small pilot study examined the muscle activity of the neck extensors (NE), sternocleidomastoids (SCM) and biceps brachii muscles was performed in 14 healthy subjects during *salat* and specified exercises using surface electromyography (EMG). No significant difference between *salat* and exercise for NE ($p = 0.482$) and SCM ($p=0.161$) was shown and *salat* might be considered a useful tool in the warming up exercises or in the rehabilitation programs.³³

Salat may also be beneficial in improving the wellbeing of patients with cervical spondylosis. In a recent study, 200 participants were divided into two groups, group A: Muslim males between the age group 40-60 years who performed *salat* four times a day or more, and group B: Muslim males between the age group 40-60 years who performed *salat* infrequently (<3/wk). They were followed up for a period of

one and half years. Out of the 118 males who performed regular *salat*, only 17 had cervical spondylosis, while among the 82 males who performed irregular *salat*, 30 had cervical spondylosis ($p<0.05$). They postulated that performing regular *salat* might assist in the prevention of cervical spondylosis.³⁴

Erectile Dysfunction

The leading cause of erectile dysfunction (ED) or impotence is arterial dysfunction, with cardiovascular disease as the most common comorbidity. Physical activity has proved to be a protective factor against erectile problems, and it has been shown to improve erectile function for men affected by vascular ED.³⁵ Physical exercise therapy, particularly involving pelvic floor muscles, has been shown to provide beneficial effects on ED, boosting blood circulation and reducing ED symptoms. *Salat* movements may be a beneficial form of pelvic floor exercise. A small pilot study including 10 volunteers were divided into two groups. Subjects who were Muslims (Group I) were asked to perform their daily *salat* and a new intervention of an additional 12 movement cycles of *salat* three sessions a week for a duration of 4 months. Non-Muslim subjects (Group II) were taught to mimic *salat* movements, and were asked to perform a total of 12 movement cycles without reading the recitation for three sessions a week. A nocturnal electrobioimpedance volume assessment (NEVA) device was used to measure the nocturnal penile tumescence (NPT) parameters. All measured parameters improved significantly, with the largest change observed in the maximum percent volumetric change over the baseline (from 138 to 222%). This preliminary study suggests that *salat* and mimicking *salat* movements, may have beneficial effects for ED patients.³⁵ A larger study, however, is required in the future to validate these findings, particularly in their utility as an adjunct to PDE5 inhibitors.

CONCLUSION

Salat is a spiritual and physical activity during which, nearly all muscles of the human body become more active than any kind of exercise without muscle fatigue. It induces serenity on the body and soul. The interaction between the central nervous system and autonomic nervous system during *salat* promotes relaxation and minimizes anxiety for individuals who regularly practice *salat*. *Salat* involves both cognitive and motor components. However, only one study is available in the literature addressing the relationship between religiosity and cognitive function. Performing *salat* may slightly reduce systolic and diastolic blood pressure but the studies available are very preliminary and more constructive studies on the effects of *salat* on cardiovascular system are warranted. Mind and body medicine as offered in the practice of *salat* may assist in the prevention of chronic illnesses such as degenerative musculoskeletal ailments and alleviate the symptoms of chronic disease. The physical activities involved in the performance of *salat* helps in the rehabilitation process in disabled geriatric patients by improving blood flow and increasing musculoskeletal fitness. As noted in this review, many studies conducted on *salat* involve small number of patients. More quantitative and qualitative research is needed to further examine the medical aspects of *salat*. Long-term studies that enroll a larger population should provide more accurate data.

LIMITATIONS OF THE REVIEW

There are several limitations in this review. There is paucity of research on this subject and hence there are very few studies investigating the clinical effects of *salat*. The majority of the studies included in this review enrolled a small number of patients. There is certainly lack of longitudinal long-term follow up of the studied subjects, and the majority of the studies were observational and not randomised. No specific attention was made to the confounding factors such as age or gender in the majority of the studies reviewed. No comparative studies were performed on the Islamic prayer and prayers in other religions. More work needs to be carried out to explore the biomechanics of *salat* and the way *salat* influences the overall health and wellbeing. For example, current literature shows that there is some activation of different muscle groups during *salat*, but the extent of activation is inconsistent in the literature and additional studies need to be carried out.²⁹ More studies enrolling larger numbers of participants are necessary to further elucidate the health effects of *salat*.

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No conflict of interest.

ETHICAL APPROVAL

This review article does not contain any studies with human participants or animals performed by any of the authors.

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