Case Control Study

The Impact of Regular Salah Practice on Balance and Fall Prevention among Community Dwelling Elderly Population

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Abstract

Background: In older population, the incidence of fall is high and balance disorder is one of the high-risk factors in them. Falls may result in various drastic episodes. Due to fear of fall the older people tends to be more immobile and stay indoors, hence their physical activities are reduced. one of the religious physical activities in muslims are salah.

Salah is a form of slow and moderate exercise. This research aims to examine the impactof regular salah practice on balance & fall prevention among community dwelling elderly population.

Methods: A case control study is carried out in sample size of 162 community dwellingelderly. The assessment of balance is done with berg balance scale, fear of fall with fallefficacy scale respectively. the statistical analysis is done with spss.v.20.

Conclusion: The result of the present study supports the assumption that religious prayers(such as Islamic prayers) beneficially influence human performance, particularly balanceand also prevents falls in elderly population. Therefore, any exercise protocol proven to be beneficial to humans should be consider beyond its religious aspect.

Key words: Salah, Namaaz, community dwelling elderly, balance, fall prevention.

Introduction

Ageing is "the accumulation of diverse deleterious changes occurring in cells and tissues with advancing age responsible for the increased risk of disease and death".[1] As age passes, physical activity and cognitive capabilities are reduced. Aging causes a reduction in strength, endurance, agility and flexibility, coordination, and balance, fear of falling is increased and their day-to-day activities are hampered.[2][3]

The elderly population in India, age 60 and above has risen from 6.0 to 8.6 percent. The prevalence of falls ranged from 18.8% to 53%, according to various studies conducted in India and abroad. Falls are a major health problem for older people, with 30–35% of those who live in the community falling at least once a year. In the older population, the incidence of falls is high and balance disorder is oneof the high-risk factors in them.[4] There is multifactorial causation of falls. It can be due to age-related

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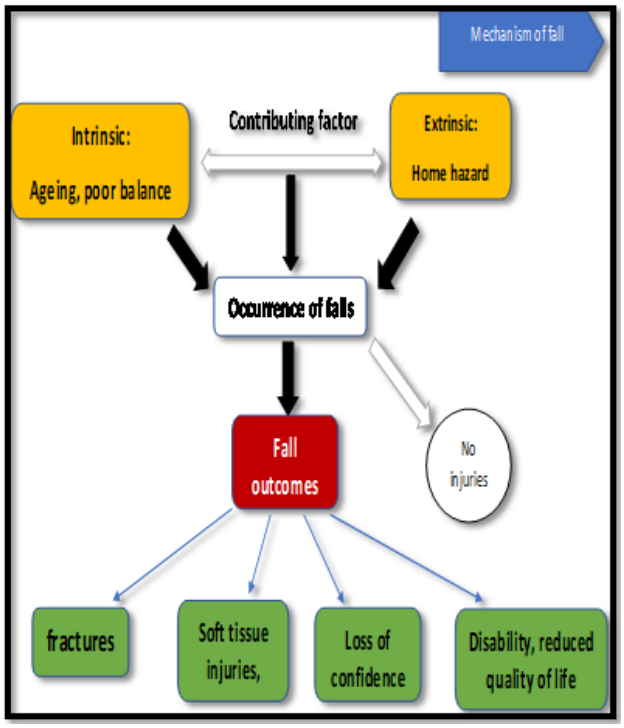
problems, like hearing problems, poor vision, balance deficits, dizziness, vertigo, postural hypotension, syncope, changes in the central nervous systems, or musculoskeletal problems like gait disturbance and muscle weakness. Environmental factors like obstacles, slippery surfaces or improper footwear, etc, also play an important role in falls. Other than these, pathological conditions and comorbid diseases like osteoporosis and physiological decline due to age (e.g., slower reflexes) increase the high chances of fall-related injury.[5] Falls may result in a laceration, contusions, soft tissue bruising, joint dislocations, fractures (femoral neck fracture is common), hospitalization, disability,[1][2] immobility, and fear of fall.[4][5]



The fear of fall is devastating. Due to fear of fall the older people tends to be more immobile and stay indoors hence their physical activities are reduced, there joint motion and muscle strength is decreased by 40%. Aerobic capacity is also reduced. Injurious falls leading to severe medical, psychological, and social sequelae are associated with high treatment costs. Although many factors, such as aging, chronic illness, sedentary lifestyle, and medication, may contribute to the risk of falling. [5] Due to all these factors their quality of life is generally affected. [6] Prevention of fall became the important factor by improving balance, giving various interventions such as tai chi, dynamic balance, stepping, and yoga etc. [7] [9]

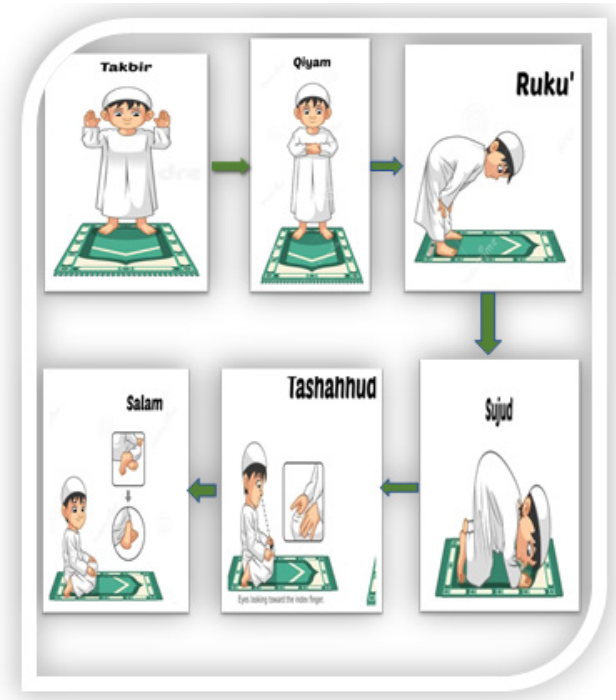
As the age passes, few people tend to adapt the low to moderate physical activities like brisk walking, jogging, yoga, meditations or religious activities. One of the religious physical activities in muslims are salah /namaaz.

Salah is the arabic term for prayers offered by muslims at least five times a day.[8] It is considered as second pillar of the Islamic faith. Muslims perform salah on various times of day – Fazr, zuhr, Asr, maghrib, Esha. Salah involves recitation of qur'anic verses with certain postures standing, bowing, prostration and sitting. Joints involved in prayer are shoulders, elbow, wrist, metatarsophalangeal, proximal and distal interphalangeal, jaw joint, temporomandibular joint, atlantoaxial joint, spinal cord, pelvis, hip, knee, ankle, and subtalar. Salah is physical and spiritual act which nearly activates all muscles of the human body, induces serenity on body and soul, without muscle fatigue. [9] Salah has following steps – takbir and qayyam, ruk'u /forward bending, jalsa / sitting, sajdah / prostration, salaam /neck turns.[9]

These are the following steps in performing salah:

Standing for prayer starting position is standing and worshippers should concentrate their minds on praying. In the comfortable standing position, the center of pressure is usually midway between the in step of the two feet. In a standing position, they have to raise their hands up to the ears and bring them down. Then they hold the left wrist with the right hand on the abdomen, above the navel, or on the chest.[9]

Bowing is done after standing. In this there is forward movement of the vertebral column, which results in activation of the back muscles especially the paraspinal muscles. This movement is supported by two straight hands grasping the hyperextended knees. In this position they recite some verses from the Quran and after this, the worshipper gradually reverts to their normal standing position.[9]



Prostration is done by putting the head down and touching the ground with forehead after the standing position, with the palms touching the ground and remaining parallel to the ears with the flexed elbows for a few seconds.[9]

Sitting and finishing salah after standing and bowing, and proceeding to prostration, sitting is done on the left leg knee flexed with the inverted dorsi-flexed ankle and flexed right knee and metatarsophalangeal joint for a couple of minutes. After that, salat is concluded by looking over one's right and left shoulder wishing peace for mankind.[8][7][9] There are rakaats in salah, each rakaat consists of 7 postures. E.g., Fazr consist of two rakaat of farz salah which means 14 postures are performed.[10] Salah is a form of slow and moderate exercise. It makes muscles contracts isometrically and isotonically, similarly as gentle exercise does. Prayers have been shown to have a positive effect on the psychological as well as the physical health of the human body. [9]

Salah has many benefits on musculoskeletal, each Raq'aa after the first has to start by standing up from either the position of prostration or from deep squatting position and it is concluded by rotating the neck to the right and to the left. Such regular repeated movements for years strengthen the overall body muscular system. These gentle movements are helpful in maintaining joint mobility and elasticity of its surrounding structures and act as a form of endurance exercise which help to protect the joints from osteoarthritis [9][11] Cardiovascular, regular salat practices may help promote relaxation, minimize anxiety, and reduce cardiovascular risk. [10] postural benefits, like stretching, increasing the range of motion, enhances balance and coordination, promotes relaxation [6][8][9] Due to parasympathetic stimulation, effect of intestinal tract, modulate breath, during prostration frontal cortex of the brain is stimulated. [9][10][11]

Hence, in current study we tried to explore in the community, the impact of regular salah practice on balance and fall prevention among community dwelling elderly population.

Materials and Methods

Study Design

Type of study: Case control study

Study setting: Mumbai and Navi Mumbai

Study population: 6o years or above elderly male and female (written consent was taken from the participants)

Sampling method: Convenience sampling

Sample size: 81 cases and 81 controls in 1:1 ratio

Total: 162, open epi software was used.

Definition

- A case was defined as community dwelling elderly people of age 60 years or above who performs regular salaah five times a day with at least 3 positions
- A control was defined as community dwelling elderly people of age 60 years or above who does not perform any specific balance training

Inclusion criteria for cases

- Community dwelling elderly of age 60 years or above.
- Both male and female
- Performing regular salaah
- Performing all positions of salaah

- Practicing salaah five times a day
- Performing salaah regularly at least for 3 months

Inclusion criterion for controls

- Community dwelling elderly of age 60 years or above.
- Not performing salaah and any balance training at least for 3 months
- Both male and female

Exclusion criteria for cases and controls

- Performing balance training
- Those who could not give consent
- Could not comprehend to the questionnaire due to neurophysiological disorders.
- Severe medical conditions (musculoskeletal, cardiovascular, neurological.)
- On medications such as sedative, hypnotics, anxiolytics, antidepressants.
- History of recent surgery
- Bed ridden elderly
- Severely ill and admitted

Materials used: Case report sheet, pencil, pen

Selection of controls

Controls were recruited simultaneously with the cases. All the older persons old age home during the study period satisfying the inclusion and exclusion criteria were recruited as controls without matching.

Matching

Matching was done for selection of controls.

Two confounding variables in the design stage: age, gender and BMI because they are strong independent risk factors.

Outcome measures

Assessment	Instrument	Psychometric property
Personal factor		Case report sheet
Fall event	Fes-i	Cronbach's alpha 0.92, intra-class coefficient 0.83
Balance assessment	Berg balance scale	(cronbach's α=0.77), (icc2,1 = 0.87)

Data collection procedure

After approval from ethical committee.

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Personally, visited the population setting.
Explained about purpose of study and procedure
Written consent has been taken.

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Subject was categorized into cases and controls

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Assessment was taken by investigator
Fear of fall: short FES-I
Balance: berg balance scale

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Data was collected
Data was analysed

Results and Discussion

Table 1: Age in years frequency distribution in two groups of patients studied

Age in Years	Cases	Control	Total
60-70	62(76.5%)	49(60.5%)	111(68.5%)
71-80	17(21%)	26(32.1%)	43(26.5%)
81-90	2(2.5%)	6(7.4%)	8(4.9%)
Total	81(100%)	81(100%)	162(100%)
Mean ± SD	67.48 ± 5.90	69.49 ± 7.15	68.48 ± 6.61

Samples are age matched with p=0.100, student t test

Table 2: Gender- frequency distribution in two groups of patients studied

Gender	Cases	Control	Total
Female	50(61.7%)	49(60.5%)	99(61.1%)
Male	31(38.3%)	32(39.5%)	63(38.9%)
Total	81(100%)	81(100%)	162(100%)

Table 3: OCCUPATION- frequency distribution in two groups of patients studied

OCCUPATION	Cases	Control	Total	P Value
HOUSEWIFE	60(74.1%)	44(54.3%)	104(64.2%)	0.014*
RETIRED	4(4.9%)	29(35.8%)	33(20.4%)	<0.001**
BUSINESS	13(16%)	6(7.4%)	19(11.7%)	0.142
BROKER	1(1.2%)	0(0%)	1(0.6%)	1.000
CA	1(1.2%)	0(0%)	1(0.6%)	1.000
DOCTOR	0(0%)	1(1.2%)	1(0.6%)	1.000
DRIVER	1(1.2%)	0(0%)	1(0.6%)	1.000
ENGINEER	1(1.2%)	0(0%)	1(0.6%)	1.000
MAID	0(0%)	1(1.2%)	1(0.6%)	1.000
Total	81(100%)	81(100%)	162(100%)	-

Chi-Square Test/Fisher Exact Test

Table 4: FES score- frequency distribution in two groups of patients studied

FES score	Cases	Control	Total
LOW	62(76.5%)	11(13.6%)	73(45.1%)
MEDIUM	19(23.5%)	28(34.6%)	47(29%)
HIGH	0(0%)	42(51.9%)	42(25.9%)
Total	81(100%)	81(100%)	162(100%)

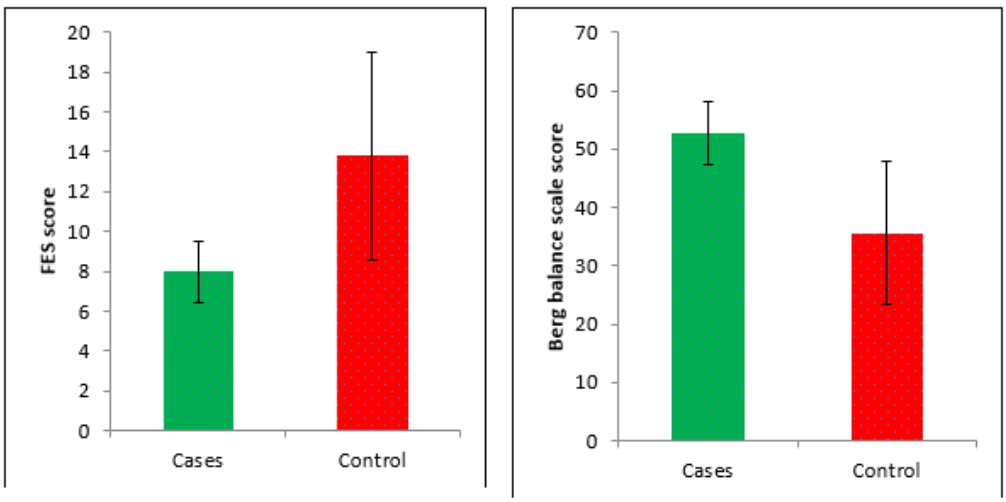
P≤0.001**, Significant, Chi-Square Test

Table 5: Berg balance scale score- frequency distribution in two groups of patients studied

Berg balance scale score	Cases	Control	Total
LOW	78(96.3%)	35(43.2%)	113(69.8%)
MEDIUM	3(3.7%)	33(40.7%)	36(22.2%)
HIGH	0(0%)	13(16%)	13(8%)
Total	81(100%)	81(100%)	162(100%)

P≤0.001**, Significant, Chi-Square Test

Table 6: Comparison of FES score and BBS score in two groups of patients studied



Discussion

The results of the current study show that the balance and stability of the subjects practicing Islamic prayer was significantly better than that of the non-practicing individuals. The results could be related to the physical and mental activities associated with Islamic prayer. Religious meditation and prayers have been found to promote relaxation and a healthier, more balanced condition of the human mind and body [7]

Islamic 'salat' prayers include both spiritual meditation and physical movements of various parts of the body and they are believed to improve equilibrium, balance, and joint flexibility as well as maintain lower limb performance [9]

Studies have revealed that salah has many benefits. It improves spiritual well-being, but also physical as well as mental health. It improves joint mobility, muscle strength, and blood circulation, when performed correctly with the right postures. [11] A study reported that the movement of the joints, concentric and eccentric muscle actions, during the prayer play an important role in balance and postural stability.[12]

To regulate upright control of the center of mass, the central nervous system has to integrate information received from several sensory inputs. These inputs come from visual, vestibular, and somatosensory sources and originate from a number of different body segments. [14]

For the preparation of 'salah', worshippers clean and wash their hand, face, head, neck and feet for several seconds with water five times daily. This action of washing the feet is believed to facilitate the plantar sensory organs thereby improving dynamic balance. An instinctive relationship exists between increasing loss of balance and loss of foot sensibility. The range of somatosensory inputs and tactile sensitivity within the foot strongly influences the maintenance of standing balance. [12]

There are some evidences suggestive of that receptors in the feet may provide significant sensory input to control standing. The source of sensory stimulation which is increasing the sensory input

and improving the balance of subjects practicing the Islamic prayer regime are may be the act of regularly cleaning and massaging he feet during ablution in preparation for the prayer ritual. [12]

Poor adjustment of the center of gravity is known to impair balance, so the movement from standing to bowing to standing during prayer may function as an exercising help the worshipper adjust the center of gravity over the feet and to control balance when the center of gravity falls out of the base support.[12]

The vestibular system is responsible for balance control. The paired vestibular organs include three orthogonal semi-circular canals and two otolith organs, which provide continuous input to the brain about rotational and translational head motion and the head's orientation relative to gravity [13]. The movements performed during salat from the vertical natural position to prostration at different speeds may improve the sensitivity of the vestibular system, which maintains the steadiness of postural equilibrium.[12]

The results of the present study show that **within the non-practicing cluster** the balance and stability was affected and the fear of fall was comparatively more as their physical activity was reduced compared to the practicing group. Decreased physical activity may indicate that there is impaired muscle fiber recruitment and adaptive behaviour to minimize risk. Therefore, the postural control during a functional activity, like leaning towards a target, could be improved by daily Islamic prayer in the same manner as passive coping strategies such as external locus control and chance locus control. The non-practicing subjects seemed to exhibit less postural control and perception because of infrequent activation of the trunk and lower extremity flexor and extensor muscles and limited facilitation of the vestibular and somatosensory systems compared with subjects actively practicing Islamic prayers five times daily.[12]

Conclusion

- The result of the present study supports the assumption that religious prayers (such as Islamic prayers) beneficially influence human performance, particularly balance and also prevents falls in elderly population.
- Islamic prayer routines may present beneficial training protocols for improving balance and preventing falls. Therefore, any exercise protocol proven to be beneficial to humans should be consider beyond its religious aspect.

Clinical Implications

- Can spread awareness regarding benefits of salaah positions.
- Can be used as treatment protocol for treating various musculoskeletal and neurological conditions.

Conflict of interest: None declared

Source of funding: No funding sources

Ethical clearance: The study was approved by Institutional Ethics committee

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