INTRODUCTION
Depression is among the leading causes of Disability Adjusted Life Years (DALY) in the world and a serious public health problem among older adults. It is projected to be among the top three causes of DALY’s lost by the year 2030 [1]. There is an alarming rise in the population of elderly in Kerala. It was 2.2 million in 1986 and rose to 4.6 million in 2011. It is expected to reach 8.3 million in 2026 [2]. Geriatric depression is a mental and emotional disorder affecting older adults. Feeling of sadness and occasional “blue” moods are normal. The elderly are more likely to suffer from sub syndromal depression. This type of depression does not meet the full criteria for major depression [1].

Yoga and Ayurveda are two great holistic sciences that aim to harmonize the body, mind, and soul. Thus Yoga is a union of the individual soul or consciousness with Cosmic, Divine or Supreme Soul or Consciousness or a total integration of the physical, mental, intellectual, and spiritual aspects of the human personality [3]. While defining health Ayurveda emphasizes the importance of the maintenance of clarity of mind and sense organs. Thus, this holistic approach can be applied for maintaining peace and tranquility of mind to obtain optimum results. The development of the mind in man-made him superior to all other living beings. So maintenance of mental health is very important. Ayurveda deals with four aspects of lifestyle which can ensure good health, dharma (virtuous acts), artha (acquisition of wealth), kama (gratification of desire), and moksha (final emancipation) [4].

In old age, progressive generalized impairment of functions occurs which results in loss of adaptive responses to depression, feeling of tiredness, and poor concentration. New surveys show a rise of old age homes in the private and government sector.

Ayurvedic formulations are effective in depression management. Aswagandha and Vacha are the drugs taken in the study.

Depriving mental health of elderly people due to these adverse circumstances and shattering family relationships can be strengthened through the holistic approaches of Yoga and Ayurveda. There is ample scope for research into the degenerative and other diseases such as depression in old age, their treatment, finally into preventive geriatrics, and the epidemiology of conditions affecting the aged. Individual, integrated, and static effects of Yoga and Ayurvedic formulation in geriatric depression can be assessed from the study.

METHODS
We conducted this study as a randomized control trial in the department of Swasthavritta at OPD of Swasthavritta, Panchakarma Hospital, Poojappura, Govt. Ayurveda College, Thiruvananthapuram. 75 patients in the age group of 65–75 years including both sexes diagnosed as mild and moderate depression as defined by ICD 10 criteria were selected as the study population.

Inclusion criteria
Patients of both sexes aged between 65 and 75 years diagnosed with mild and moderate depression based on ICD 10 TR (international classification of diseases tenth revision) criteria.

Exclusion criteria
- Lack of consent
- Severe depression based on ICD 10 TR criteria
- Individuals with dementia, stroke.
- Individuals with significant psychiatric impairment.
- Patients did not fit for doing yoga.

The study was conducted for 2 years. Study participants were randomly allocated to one control group and two study groups as per the block randomization method. The control group received the drug proven as per previously published literature [5]. 4 g churna consisted of 3.75 gm Aswagandha and 250 mg of Vacha given twice a day with water as anupana to the control group. The first study group (SG1) was
given selected yoga techniques which were included after a pilot study. The second study group (SG2) was given a selected yoga technique along with churna as in the control group. The duration of the trial was 30 days which was followed up after 45 days.

Preparation and ingredients of churna
Ashwagandha - Withania somnifera (Linn) Dunal
Vacha - Acorus calamus Linn.

25 kg of ashwagandha was taken in a vessel. Milk was poured till it dips the ashwagandha roots fully. The vessel was kept on fire. Ashwagandha roots were boiled until the milk get reduced completely [6]. The same procedure was repeated 3 times. After that ashwagandha roots were taken and dried in the sunlight. After proper drying ashwagandha roots were powdered in a very fine manner in a grinding mill and kept airtight in non-reactive containers.

1.5 kg of Vacha rhizomes were taken and dried properly in sunlight. After proper drying Vacha rhizomes were powdered in a very fine manner in a grinding mill and kept airtight in non-reactive containers.

The selected yoga techniques were practiced in the patients of the first study group (yoga). It includes an initial prayer followed by sukshmanayayana [7] (loosening exercises). Next in sitting posture Vakrasana [8] was done followed by Pavanamuktasana [9] in the supine position and Bujangasana [10] and Makarasana [11] in the prone position. In the next stage, Pranayam [12] such as Suryabhedhi, Chandrabhedi, Naadishudhi pranayama, and Bhramari Pranayama were given. Finally, Savasana followed by 20 min of Deep relaxation technique and Yoga Nidra [13] were given. A combination of selected yoga and churna was given in the second study group. The objective of the study was to assess the effect of selected Yoga techniques along with ashwagandha and Vachain depression in the age group 65-75 years. The three groups were observed before treatment, after treatment, and after follow-up. Changes in the variables were compared between the groups and are statistically analyzed. The drug has been selected from an already proven study. Consent from the patients and the Institutional Ethical Committee was also obtained before the study.

Study design
Randomized Controlled Trial.

Sample size
Sample size (n) is calculated by the formula given by Where Z = 1.96 and β = 0.84  “SD” is Standard Deviation “d” is Mean difference

“SD” and “d” value is calculated from the previous study on Depression with the Hamilton Rating Scale. The value of “SD” was 4.255 and “d” value was 3.5. With these values “n” is calculated to be 23. So we will upsize the sample size to 25 to cover up the dropouts if at all there will be.

Sampling technique
Balanced randomization of successive blocks
75 patients of both sexes between 65 and 75 years of age with depression were randomly allocated into three groups by block randomization done with "WINPEPI" software [14].

Statistical analysis
Quantitative variables were expressed as mean and standard deviation. Qualitative variables were expressed as a proportion. Change in quantitative variables in successive observation and the comparison of changes between the three groups was analyzed by repeated measure ANOVA. Comparison of qualitative variables between three groups was analyzed by Chi-square test. Paired t-test was done for analyzing the difference in successive observations, (BT-AT), (AT-AF), and (BT-AF) statistically. p<0.05 was considered statistically significant. Data analysis was performed using SPSS Ver. 22.0.

Ethical consideration
The selected yoga techniques and the Ayurvedic formulation have no side effects and complications. The drug has been selected from an already proven study. Consent from the patients and the Institutional Ethical Committee was also obtained before the study.

RESULTS
There were 34 males and 41 females as participants.

Data related to Hamilton’s rating scale and response to treatment
Between the group analysis using one way-ANOVA
The control group and both study groups showed a significant reduction in the total score of the Hamilton Rating Scale for Depression after treatment and after follow-up period. Results were more significant in the second study group than in other groups (Table 1).

The average score of Insomnia late, Agitation, Anxiety somatic, Genital score, Hypochondriasis showed p<0.05.

The depression level of the patients after treatment among the three groups was comparable (p>0.05), that is there was no difference among the groups. All the groups showed improved almost similar change. There was the difference in improvement among the groups after follow-up in levels of depression (p<0.05). The second study group showed a significant reduction than other groups (Table 2).

Table 1: HAM D variable and significant response with different arms

| Ham D variables | Treatment level | Group | p value |
|-----------------|-----------------|-------|---------|
| Depressed mood  | After follow up  | Drug and Yoga (SG2) | <0.05 |
| Suicide         | After follow up  | Drug and Yoga (SG2) | <0.05 |
| Loss of weight  | After follow up  | Drug and Yoga (SG2) | <0.05 |
| Work and activities | After follow up | Drug and Yoga (SG2) | <0.05 |
| Guilt           | After treatment  | Control group (Drug) | <0.05 |
| Insomnia middle | After treatment  | Yoga (SG1) | <0.05 |
| Anxiety psychic | After treatment  | Drug and Yoga (SG2) | <0.05 |
| Somatic general | After treatment and after follow up | Drug and Yoga (SG2) | <0.05 |

The observed difference in average HAM-D score before treatment was not statistically significant (p>0.05).

Data related to total score
The control group and both the study groups showed significant reduction in the total score of the Hamilton Rating Scale for Depression after treatment and after follow-up. Results were more significant in the yoga and drug group after treatment and after follow-up (Table 3).

Table 2: HAM-D score related to levels of depression

| Before treatment | Group with% |
|------------------|--------------|
| Mild depression  | A-40%, B-60%, C-44% |
| Moderate depression | A-60%, B-40%, C-56% |
| After treatment | Group with% |
| Normal | A-100%, B-96%, C-100% |
| Mild depression | A-0%, B-4.3%, C-0% |
| After follow-up | Group with% |
| Normal | A-100%, B-96%, C-100% |
| Mild depression | A-0%, B-4.3%, C-0% |
### Table 3: Data related to the total score

| Group   | Mean | SD  | Mean | SD  | p    |
|---------|------|-----|------|-----|------|
| BT (n=25) | 14.12 | 2.93 | 12.96 | 3.17 |      |
| AT (n=23) | 2.61  | 2.08 | 2.17  | 2.19 |      |
| AF (n=23) | 5.52  | 2.83 | 4.13  | 3.96 |      |

| Group   | Mean | SD  | Mean | SD  | p    |
|---------|------|-----|------|-----|------|
| BT versus AF | 14.36 | 2.64 | 13.81 | 2.95 | 0.201 |
| AT versus AF | 1.17  | 1.34 | 1.99  | 1.97 | 0.039 |
| BT versus AF | 2.87  | 2.42 | 4.17  | 3.28 | 0.021 |

### Table 4: Repeated measure ANOVA

| Source | Type III sum of squares | Mean Square | F     | p    |
|--------|-------------------------|-------------|-------|------|
| BT-AT  | 549.1855                | 2           | 2745.928 | 862.173   | <0.001 |
| AT-AF  | 87.07                   | 4           | 21.768  | 6.835 | <0.001 |
| Error  | 420.406                 | 132         | 3.185  |      |      |

### Table 5: Paired t-test of HAM-D score in three groups

| Group   | Paired comparison | Paired difference | t     | p    |
|---------|-------------------|-------------------|-------|------|
| Group A | BT versus AT      | 11.48             | 2.68  | 20.56 | <0.001 |
|         | AT versus AF      | -2.91             | 2.54  | -5.50 | <0.001 |
|         | BT versus AF      | 8.57              | 2.84  | 14.46 | <0.001 |
| Group B | BT versus AT      | 10.65             | 2.01  | 25.37 | <0.001 |
|         | AT versus AF      | -1.96             | 2.51  | -3.73 | <0.001 |
|         | BT versus AF      | 8.70              | 2.14  | 19.48 | <0.001 |
| Group C | BT versus AT      | 13.44             | 2.57  | 25.04 | <0.001 |
|         | AT versus AF      | -1.70             | 1.94  | -4.19 | <0.001 |
|         | BT versus AF      | 11.74             | 3.21  | 17.55 | <0.001 |

After treatment, the average HAM-D score among the control group, first study group, and second study group was 2.61±2.08, 2.17±2.19, and 1.17±1.34, respectively. There was a significant difference in HAM-D score after treatment among the groups. The second study group experienced a comparatively greater reduction in HAM-D score after treatment than other groups (p<0.05). A similar trend was maintained after follow-up score. The second study group had a comparatively lesser HAM-D score after follow-up than other groups.

**Pairwise comparison**

Health retirement study found an age-related increase in depressive symptoms in adults 65 years of age and older [19]. The results showed that 10% of men aged 65–69 were depressed compared to 15% women. In the study, 40% of men aged 65–69 were depressed compared to 60% women. Both illiterate and literate population was a prone depression in old age. More percentage of depression is present among the lower level of the education group. Studies conducted by Kennedy Gary et al. and Ramachandran et al. also reported a significantly higher prevalence of depression in the geriatric population belonging to the low socioeconomic status group [19]. A majority of 55% of the total study population were from rural areas and 45% from urban areas. A study by Thilak et al. on prevalence and factors associated with depression among the elderly in rural areas of North Kerala showed a prevalence of geriatric depression to be 72.4% which agrees with the findings of the study [20]. Considering the total population, 61% were married, 15% were separated, and 24% were widows/widower. Studies conducted by Kennedy Gary et al. and Ramachandran et al. found that low socio-economic status is one of the factors for geriatric depression [21]. Out of the total study population, 31% were housewives, 28% were doing fieldwork, and 41% were Pensioners. The data show that majority of the population was leading a retirement life. Retirement is also having relation to depression and retirement has been mentioned by Oliffe et al. (2013) [22]. Retirement life reflects on the failed aspirations for wealth and achievement. Depression, after retirement, is seen particularly among men. About 37.3% of the total population presented a family history of depression. Out of the total study population, 41% had past psychiatric illness. History of past psychiatric illness is a major factor in inducing depression in old age.

**Pairwise comparison**

Out of the total study population, 97% had past stressful life events.

**Discussion**

Mental health is an essential factor in attaining sound health. The aging population is both a medical and sociological problem. The current explosion of non-communicable diseases such as cardiovascular diseases, cancer, and depression in the ever-increasing number of older persons globally, will result in enormous human and social costs unless preventive action is taken.

Withania somnifera reduces stress by delaying the release of cortisol by the adrenals and prevents the negative effect of long-term cortisol production on the body. Ashwagandha is one of the best adaptogenic herbs used in the Ayurvedic system of medicine. Ashwagandha was found effective in depression in a clinical trial conducted by Nath et al. [15]. The rhizome-drug Vacha is sedative, tonic, and tranquillizer in action. It is used for brain rejuvenation, cerebral circulation promoter, detoxifies subtle channels, insanity, mental sharpness, memory loss, and insomnia. Both the drugs are Matahari and kaphahara. Apart from this, the formulations also possess the qualities to improve overall health and rejuvenate the body [16].

The *yogic* treatment of depression focuses on the improvement of mental health to cope up the stressful situations in old age. Postural exercises bring both physical and mental well-being. Studies show that *asanas* produced a reduction of acetylcholine, an increase of catecholamine levels, decrease of cholesterol, and an enhancement of endocrine functions [17]. Studies show that *pranayama* brings a reduction in biochemical parameters such as serum cholesterneses, plasma catecholamines, serum lipids, serum cholesterol, and blood sugar [17]. Deep relaxation techniques along with *yoga nidra* cause efficient relaxation of the mind and gives freshness to the entire psychosomatic apparatus to restart its work with greater vigor and strength. In the practice of *yoga nidra*, the inherent tendency to become tense is rooted out and the individual starts viewing the situation as less demanding. A RCT-designed study by Rani et al. (2011) observed the impact of *yoga nidra* on psychological general well-being in depression among patients with menstrual disorders using *Ham-D*. In the study, it was concluded that the patients with mild to moderate depression and anxiety symptoms improve significantly with *yoga nidra* as an intervention [18].

The current population is both a medical and sociological problem. The current explosion of non-communicable diseases such as cardiovascular diseases, cancer, and depression in the ever-increasing number of older persons globally, will result in enormous human and social costs unless preventive action is taken. Studies conducted by Kennedy Gary et al. and Ramachandran et al. also reported a significantly higher prevalence of depression in the geriatric population belonging to the low socioeconomic status group [19]. A majority of 55% of the total study population were from rural areas and 45% from urban areas. A study by Thilak et al. on prevalence and factors associated with depression among the elderly in rural areas of North Kerala showed a prevalence of geriatric depression to be 72.4% which agrees with the findings of the study [20]. Considering the total population, 61% were married, 15% were separated, and 24% were widows/widower. Studies conducted by Kennedy Gary et al. and Ramachandran et al. found that low socio-economic status is one of the factors for geriatric depression [21]. Out of the total study population, 31% were housewives, 28% were doing fieldwork, and 41% were Pensioners. The data show that majority of the population was leading a retirement life. Retirement is also having relation to depression and retirement has been mentioned by Oliffe et al. (2013) [22]. Retirement life reflects on the failed aspirations for wealth and achievement. Depression, after retirement, is seen particularly among men. About 37.3% of the total population presented a family history of depression. Out of the total study population, 41% had past psychiatric illness. History of past psychiatric illness is a major factor in inducing depression in old age.

Out of the total study population, 97% had past stressful life events.
Family breaks up and that was mainly in the female population. Due to family break up most of the population was living lonely in separate houses or old age homes. Out of the total study population, 57% had a history of alcoholism in the family. Nurnberger et al. in the results of COGA (Collaborative study on the Genetics of Alcoholism). Studies determined the prevalence of major depression and depressive syndrome in the families of the alcoholic probands [23]. Considering the whole study population, 67% of the patients had no exercise in their regimen and 33% had regular exercise. This was one of the major findings of the study. Harvey et al. (2010) found an inverse relationship between the amount of leisure-time physical activity and diagnostic-level symptoms of depression. Exercise can be taken as a universal indicator for the prevention of mental illness in old age particularly associated with vascular diseases as this helps in neurogenesis in degenerative age [24].

The diet has a protective effect against the incidence or recurrence of depression as well. Sanchez-Villegas et al. observed that the incidence of depressive disorders was reduced by 25–50% with the replaced diet [21]. From the study, a majority of 88% showed mixed dietary habits. Most of the population in all classes of the family had poor knowledge about the diet to be followed in this age group. In the total population, the majority had osteoarthritis followed by diabetes, hypertension, dyslipidemia, and thyroid dysfunctions. Gary et al. and Barua et al. had observed a high prevalence of depression in individuals of geriatric population, who were suffering from four or more comorbid chronic conditions that included diabetes, arthritis, and hypertension bronchial asthma [25].

CONCLUSION
There was a change in levels of depression from moderate to mild and mild to normal in the study. Reductions levels of depression were seen in three groups after treatment. Results were more significant in the yoga and drug group after treatment and after follow-up.

A combination of Yoga and Ayurveda showed more significant change after treatment and after follow-up. Hence, it can be concluded that a holistic approach can bring a better and static result than either applying the treatment modalities alone.

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AUTHORS CONTRIBUTION

SM - Concept, data collection, and manuscript preparation. VKS - Design, manuscript editing, and proofreading. JD - Concept, data analysis, manuscript editing, and proofreading.

CONFLICTS OF INTEREST
No conflicts of interest exist

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REFERENCES

1. Available from: https://www.emro.who.int/health-topics/depression [Last accessed on 2018 Jun 11].
2. Facelift for Old Age Homes; 2019. Available from: https://www. thehindu.com. [Last accessed on 2019 Mar 22].
3. Misra SP. Introduction. In: Yoga and Ayurveda. 3rd ed. New Delhi: Chaukamba Publications; 2004. p. 110-002.
4. Sharma RK, Dash DV. Charaka Samhita Sutrasthana. Ch. 1. Varanasi: Chaukamba Publishers; 2006. p. 19.
5. A Study on Unnada with Special Reference to Manohdhukajonnada and the Efficacy of Ashwagandha and Vachacurna in its Management by Aswin Chandra under the supervision of guide Prof. Dr. SurendranMD, Ph.D. Manovijnana. Kottakkal: VPSV Ayurveda College; 2013.
6. Parameswaran Nair PK. Shudhikrama Sangraha. 1st ed. Thrivunanthapuram: Kerala Books; 2005. p. 125.
7. Dilip Kumar KV. Clinical Yoga and Ayurveda. Varanasi: Chaukamba Publishers; 2015. p. 181-98.
8. Bakhru HK. Naturopathy for Longevity. Ch. 7. Mumbai: Jaico Publishers; 2007. p. 72.
9. Dilip Kumar KV. Clinical Yoga and Ayurveda. Varanasi: Chaukamba Publishers; 2015. p. 57-9.
10. Dilip Kumar KV. Clinical Yoga and Ayurveda. Varanasi: Chaukamba Publishers; 2015. p. 64.
11. Dilip Kumar KV. Clinical Yoga and Ayurveda. Varanasi: Chaukamba Publishers; 2015. p. 64-5.
12. Sarasswati SS, MukthiBhodana S. Hatha Yoga Pradipika. Ch. 2, Munger; Bihar: Yoga Publication Trust; 2016. p. 239.
13. Kumar K. A Handbook of Yoga Nidra. Ramesh Nagar. Ch. 18. New Delhi: D. K. Print World Publishers; 2013. p. 1-55.
14. WINPEPI (PEPI-for-Windows)-Briton Health; 2018. Available from: https://www.brixtonhealth.com [Last accessed on 2018 May 12].
15. Sabins VD. Chemistry and Pharmacology of Ayurvedic Medicinal Plants. 1st ed., Vol. 12. Varanasi: Chaukamba Publishers; 2008. p. 387-90.
16. Sastry JL. Dravyaguna Vijnana. 2nd ed., Vol. 2, Ch. 82. Varanasi: Chaukamba Publishers; 2005. p. 548-50, 221001.
17. Udupa KN. Stress and its Management by Yoga. 2nd ed., Ch. 10. New Delhi: Motilal Banarsidass Publishers; 1985. p. 110-007, p110, 153
18. Rani K, Tiwari S, Singh U, Agrawal G, Ghildiyal A, Srivastava N. Impact of Yoga Nidra on psychological general wellbeing in patients with menstrual irregularities: A randomized controlled trial. Int J Yoga 2011;4:20-5.
19. Federal Interagency Forum on Aging-Related Statistics, Health Retirement Study; 2012. Available from: https://www.agingstats.gov.
20. Barua A, Ghosh MK, Kar N, Basilio MA. Socio-demographic factors of geriatric depression. Indian J Psychol Med 2010;32:87-92.
21. Thilak SA, Sarada AK. International Journal of Community Medicine. Available from: https://www.ijcmpn.com -.article-.view [Last accessed on 2019 Apr 20].
22. Olliffe JL, Rasmussen B, Bottorf JL, Kelly MT, Galdas PM, Phinney A, et al. Masculinities, work, and retirement among older men who experience depression. Qual Health Res 2013;23:1626-37.
23. Is there a Genetic relationship between Alcoholism and Depression; 2019. Available from: https://www.pubs.niaaa.nih.gov/arh26-3 [Last accessed on 2019 Apr 20].
24. Harvey SB, Hotopf M, Overland S, Mykletun A. Physical activity and common mental disorders. Br J Psychiatry 2010;197:357-64.
25. Meleppurakkal et al. Asian J Pharm Clin Res, Vol 14, Issue 11, 2021, 65-68

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