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Effect Of Strengthening And Proprioceptive Exercises On Balance And ADLs In Knee Osteoarthritis

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INTRODUCTION

Degenerative knee arthritis could be a chronic joint disease, primarily occurring in aged men and ladiesKnee degenerative arthritis is characterized not solely by ache however it occursalong with weakness in muscles which cause restrictions in performing daily activities and helps to bear stresses which occur due to overload of work.The general changes takes place in knee complex in which articular cartilage get serosed, organic chemistry and certain changes in membrane, joint capsule and lining of bones which get hypertrophied (bones tends to have increased mass)i.e. having conical shape extra bone growth in an area.[1]Knee OA involves the whole complex which not only affect the cartilage but also the ligaments along with surrounded structures such as leads to alteration in functioning along with restriction.

Knee OA is an aching and even exhaust condition that affect several individuals.[10] Patients having degenerative knee osteo arthritis have a complain of pain, stiffness of the joint, reduced strength of the muscles, instablility within the joint leading to reduced function and proprioceptive activity also get limited or reduced and also Leading to reduced ADLs
Many researches has been done dealing with the risk factors including increase in weight age factor as well as any history of injury to the knee, BMD get reduced leading to unstable joint , loss of movement, trauma to the joint and because of syphilis, occurrence of peripheral nerve involvement is seen and other conditions such as leprosy etc.[1,5,6,7]
Cartilage shows presence of development of crystals, repeated use of joint and limited activities, which arephysical in nature. The presence of OA in hand and any past history of diabetes to the patient including conditions related to cardiovascular. Crouching and twisting can be used for about more than 2 hours per day can be the cause for increase danger of knee OA varying from moderate to extreme of it.

As an outcome, more emphasis is on the advancement of preventive methodologies utilized as a part of shielding the knee joint from mechanical harm and stretch. The latest WHO report on the world wide accountability of diseases hows that OAof knee is the fourth most essential reason for handicap in women, and the eight most vital cause in men. Individuals influenced with symptomatic knee OA are inclined to increment because of aging and the rate of corpulence or overweightin the all-inclusive community. Females, significantly those greater 55 years, have additional last stage OA inside the knee joint further not in another position. The out come of the research had illustrated various sex variation of knee arthritis mainly during menopausal age period.

The precedence measure was markedly higher in women than in men and raised considerably with age.[26]Moreover low level of training and increased weight were related to OA of knee. Signs were present in 43% of knee OA patients. 28% of symptomatic sufferers have osteoarthritis of knee, which is seen in radio graphs, 16% had osteoarthritis, which shows symptoms whereas 8% had last grade osteoarthritis of knee. It was seen to be increased in older people and ladies. Treatment of knee OA is directed towards reducing pain and correcting physical performance and includesdrug medical care, mucopolysaccaride injection, glucosamine and chondroitin sulphate use, exercises, physical therapy, techniques for restoring knee alignment and diet applications for weight loss.

The medical management of knee arthritis includes –paracetamol, analgesicsand NSAIDs drugs may be used as physiological problem on a basis, which is used regularly, however should be used with care. Cyclo- oxygenase-2-particular inhibitorsareutilized if there are danger thought processes in upper GIissues, however just while considering CV hazard.
Glucosamine sulfate might be a protected and compelling over-the-counter treatment and intra-articular treatments are utilized onceothersareunsuccessful

In clinical practice, rehabilitation for knee OA generally aims in reducing pain and disability by strengthening , rising the endurance, range of motion, proprioception and improving aerobic fitnessNumerous parts of human body, for example, the sensory system, proprioception, muscle quality , sight and cognition are all connected with the balance control , which is an essential capacity in every day life.[14]As the knee is the most weight bearing joint, and OA of the knee is thought to be a major risk factor for fall injuries.

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Thus, it may be important for OA patients to get training connected with counteracting falls and rehabilitative instructing onceevaluating their exercises of day-by-day livings and balance control abilities. It is important for OA patients to receive education associated to prevent falls and can rehabilitate once assessing the re activities of daily living sand balance control skills. Clinical balance analysis tests such as TUG, FRT, 10 meter walking test and therefore the Berg balance scale (BBS)[15,22] and Knee Injury and Osteoarthritis Outcome Score(KOOS)[20,23] are all according to own high intraclass correlation and reliability.
The BBS isused to measure balance in elderly people by checking out the attainment of functional tasks and the scoring is done by a five-point scale, extending from 0-4. "0" denotes functional activity at the lowest level and "4" at the highest level of function. Total Score includes 56 and is interpreted as: 41 to 56
= low fall risk, 21 to 40 = medium fall risk and 0 to 20 = high fall risk.
Whereas the KOOS survey is utilized to assess the individuals condition about knee and related issues like knee OA and it comprises of 5 sub components which incorporates pain(36), symptoms(28), ADL (68),function in sport and recreation(20) and QOL (16). Everything in KOOS is scored 0 to 4 and the crude scorefor every segment is the total of thing scores. The scores are then changed to a 0 to 100 scale.

Higher score indicates lesser problems.
Transformed score: 100-actual raw score x 100 / possible raw scale range
An earlier studied examination on osteoarthritic patients with age and sex controls showed that the quadriceps muscle strength and proprioception reduces and postural sway is increased in the individuals with knee osteoarthritis.

OBJECTIVES
- To study the effect of strengthening exercises on balance and ADLs in knee osteoarthritis.
- To study the effect of proprioceptive exercises on balance and ADLs in knee osteoarthritis.
- To compare the effect of strengthening exercises and proprioceptive exercises on balance and ADLs in knee osteoarthritis.

METHODOLOGY
RESEARCH HYPOTHESIS:
There is a significant difference within the strengthening exercises and proprioceptive exercises on balance and ADLs in knee osteoarthritis

NULL HYPOTHESIS:
There is no significant difference within the strengthening exercises and proprioceptive exercises on balance and ADLs in knee osteoarthritis.

METHODSNUMBER AND SOURCE
Around 50 patients with OA Knee, Knee pain, knee sickness were assessed from that 30 patients were selected after due consideration of the inclusion and exclusion criteria. Study was conducted for duration of 6 months at Department of physiotherapy, Vardhan Hospital, Duhai.

INCLUSION CRITERIA:
- Patients diagnosed on the basis of radiological examination shown in the X- ray of the knee joint.
- Patients presenting with symptoms more than 3 months like pain, joint stiffness, functional disability, decreased muscle strength and limitations in performing ADLs.[2,16,17]
- Ageabove 50 years both genders[13,16]
- Patients with bilateral knee OA

EXCLUSION CRITERIA:
- Any history of knee, hip or ankle surgery
- Mentally deficits patients
- Peripheral vascular disease
- Patients with cerebrovascular disease, visual disturbance
- Articular injection to knee joint

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RESULTS

Table 5.1 Comparison between gender and age of two groups

No. of participants	Group 1 (10)	Group 2 (10)
Male	3	6
Female	7	4
Age (yrs)	58± 3.03	62.4± 5.55

Table 5.2 Comparison of pre and post treatment of Group 1 (Strengthening exercise)

	Pre (Mean ± SD)	Post (Mean ±SD)	T value
BBS	34 ± 3.590	52.50 ±1.509	-16.123*
Pain	47.80 ± 9.773	86.30 ± 7.134	-13.21*
Sym	41.40 ± 8.972	86.40 ± 3.688	-12.814*
ADL	59 ± 6.928	93.20 ± 1.874	-15.475*
SRA	23.50 ± 11.068	69.50 ± 9.265	-12.65*
QOL	33.70 ± 4.762	84.50 ± 3.689	-43.349*

'*' represents significant at p<0.05

Patients treated with the strengthening exercises showed 't' value of BBS scale was -16.123 (at p<0.000) and the parameter of KOOS scale such as pain showed -13.21, other symptoms showed
-12.814 (at p<0.000), ADL showed -15.475 (at p<0.000), SRA showed -12.65 (at p<0.000) and QOL showed -43.349(at p<0.000). Thus all the above parameter showed a significant difference in all the above parameters.

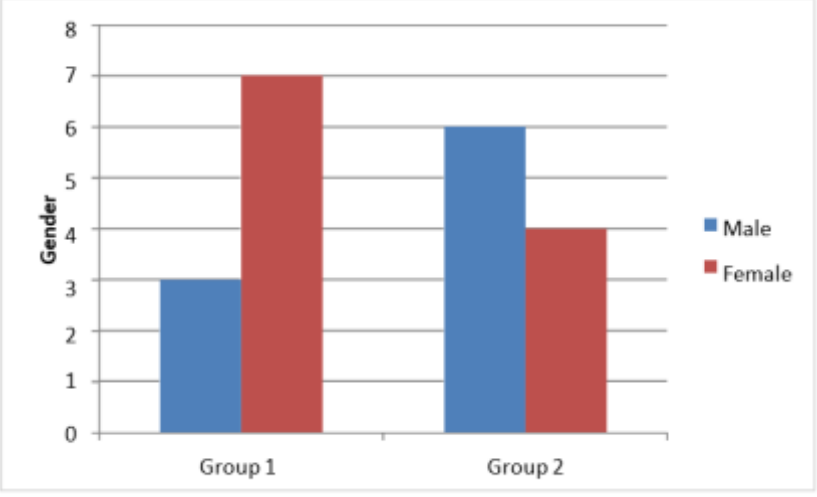
Table 5.3 Comparison of pre and post treatment of Group 2(Proprioceptive exercises)

	Pre (Mean ± SD)	Post (Mean ±SD)	T value
BBS	33.70 ± 4.809	49.80 ± 3.824	-13.15*
Pain	50.80 ± 10.612	86 ± 6.146	-13.481*
Sym	41.70 ± 8.820	83.20 ± 8.244	-12.907*
ADL	57.10 ± 8.006	88.20 ± 5.391	-9.568*
SRA	27.50 ± 13.994	61.50 ± 13.550	-16.333*
QOL	31.50 ± 4.813	84.50 ± 3.689	-27.349*

'*' represents significantat p<0.05

Patients treated with the proprioceptive exercises showed' value of BBS scale was -13.15 (at p<0.000) and the parameter of KOOS scale such as pain showed-13.481(at p<0.000), other symptoms showed-12.907(at p<0.000), ADLshowed-9.568(at p<0.000), SRA showed-16.333(at p<0.000) and QOL showed-27.349(at p<0.000).Thus all the above parameter showed a significant difference in all the above parameters.

Graph 5.1 Graphical representation of gender of two groups



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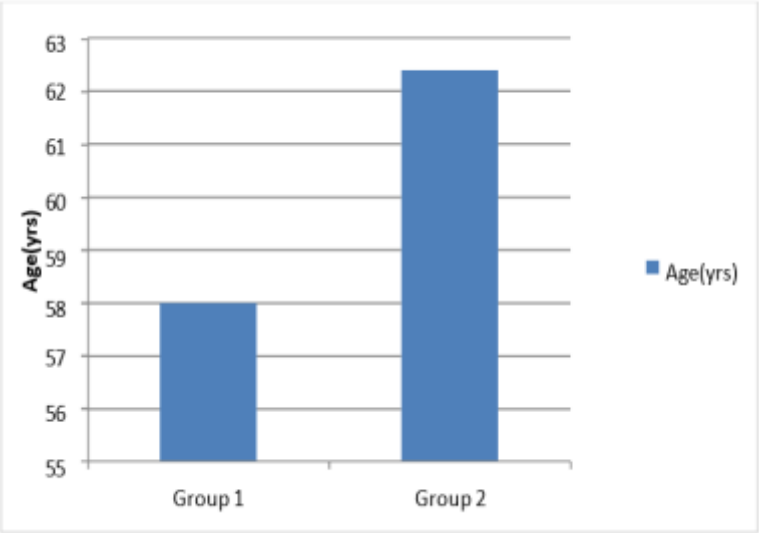
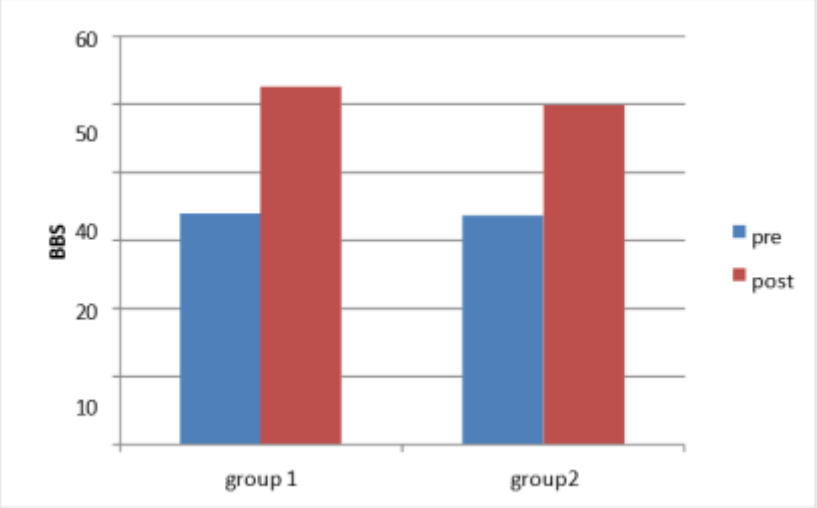
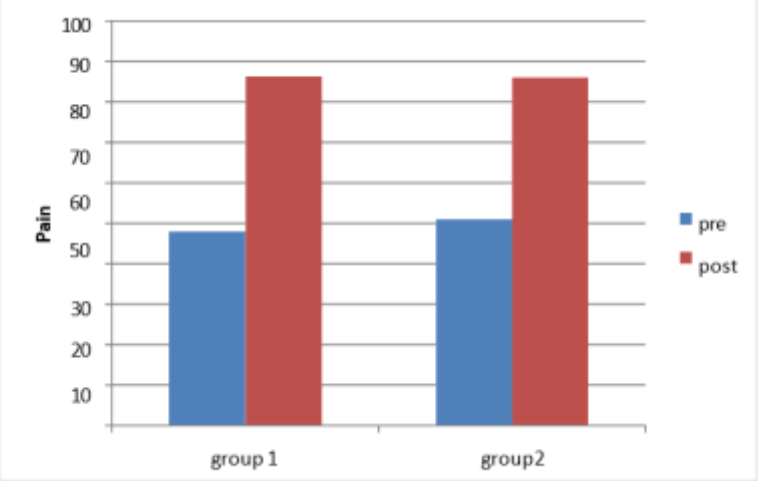
Graph 5.2 Graphical representation of age of two groups



Graph5.3 Graphical representation of BBS scale



Graph5.4 Graphical representation of Pain scale



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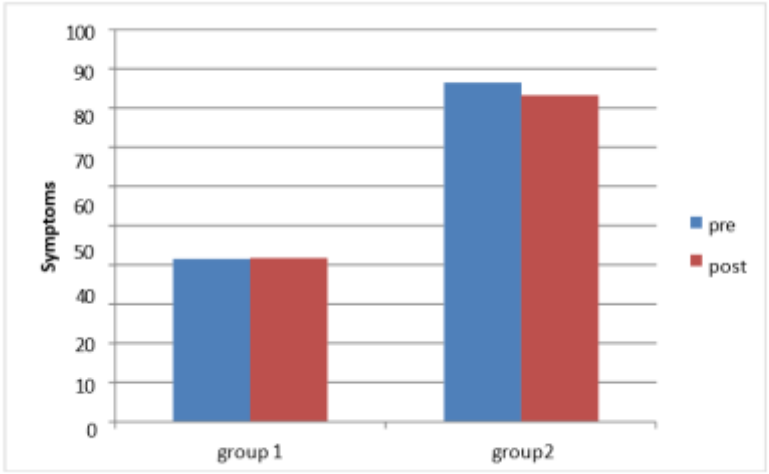
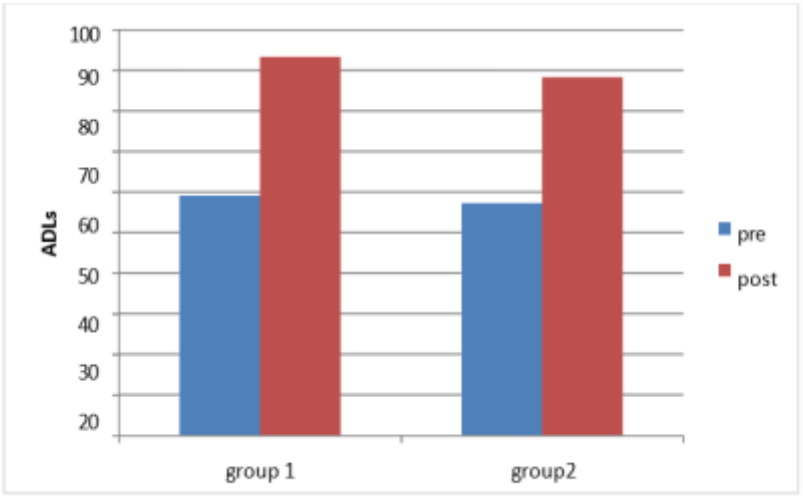
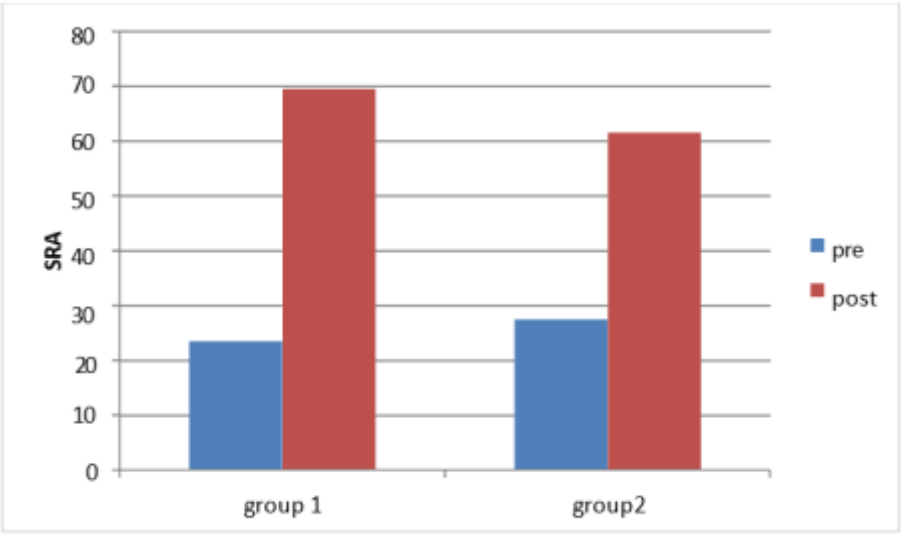
Graph5.5 Graphical representation of symptoms



Graph5.6 Graphical representationof ADLs



Graph5.7 Graphical representation of Sports and Recreation



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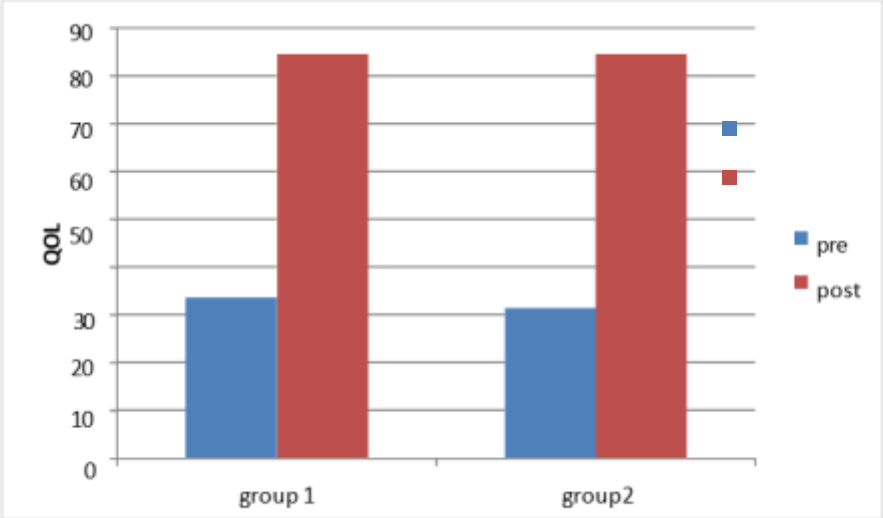
Graph5.8 Graphical representation of Quality of Lifein knee OA patients



DISCUSSION

Knee OA is a condition which is rapidly changing our society into an aging society and leads to various complications like pain, swelling around knee joint , stiffness , decreased ROM , loss of balance control, decreased function in daily living thus affecting the quality of life of an individual.

Scheila C O'Reilly in his studied determined the quadriceps strength, function, structural changes and psychological status in subjects with knee pain and the results show the lower quadriceps strength and activation and concluded that quadriceps strength is strongly associated with the knee pain and disability and further leads to weakness of quadriceps muscle due to pain and lack of activity, frequent fall injuries due to lack of balance control.

There are many more articles supporting that due to increase pain and decrease in muscle strength, proprioception leads to the postural instability.

In atrial by Da - Hon Lin investigated the out comes of two different non -weight bearing exercises program i.e. proprioceptive training versus strength training in knee OA patients. He terminated that both strengthening and proprioceptive training exercises show important improvement and proprioceptive training has larger improvementin proprioceptive function while strengthening has larger increasein knee extensor strength and the result shows a significant improvement in both the exercises program.

This study shows the improvement in both the strengthening exerciseas well as proprioceptive exercise groups but in intra comparison of both the groups showed a significant difference in BBS scale however it was noted that activities of daily living is improved in subject streated with strengthening exercises as it involves non weight bearing exercises thus leads to decrease in pain, increase in muscle strength and thus increases the range of motion of knee joint.

In atrial by Srinivas Mondan, revealed that the experimental group who has received the proprioceptive exercises has shown average reduction in pain according to the VAS score and WOMAC Indus scoreand distention in the active ROM and assumed that in the knee OA management the best selection of treatment could be a proprioceptive exercises.

Whereas in this study, subjects are given proprioceptive exercises and their balance is improved along with reduction in the symptoms which can be due to the correct mechanical loading which enhance the stability of the joint and thus leads to extended ROM, quality of life and proprioception.

The females are more prone to have knee OA as the age group taken in this study is above 50 years which is the peak age of occurrence of menarche in females which leads to many complications such as inappropriate nutritional supply to the body, the bone calcium is reduced (bone mass density) along with various hormonal changes and can be due to the lack of inactivity also.

It is also seen that change in the life style affect both males and females as it tend to increased weight which will lead to more transfer of stress forces on knee and as week now that knee is oneof the most weight bearing joint so maximum stress load that will result in reduced cushioning effect due to reduced amountof GAGs which is hydrophilic in nature which is the primary change that occursin the knee complex.

The strengthening group has shown much improvementin individuals who are unable to exercise in a weight bearing

posture i.e. proprioceptive exercises due to pain or other reasons.

As the osteoarthritis is aprogressive condition which cannot be cured completely but it can be maintained and prevented from the further progression and for this the subjects are treated with therapeutic modalities and exercises which can be varied from strengthening exercises or proprioceptive exercises .
As this study involves the subjects affecting from mild to moderate knee OA and are thus treated with exercise therapy and no surgical procedures has been done. As per this study one group has been given strengthening exercises and theother group has been given proprioceptive exercises and this is noted that the former group shows a better improvement in both the balance and activities of daily living as per the BBS and KOOS scale. The strengthening exercises were better than the proprioceptive exercises which can be due to increased muscle strength of the quadriceps and as it involves the non weight bearing exercises which are easy for the patients to initiate and perform on the regular basis and are less painful. There is less varus deformity seen in the patientstreated with strengthening exercise and aflexion deformity is seen in some patients treated with proprioceptive exercise.

FUTURE RECOMMENDATIONS

- As this study has not taken patients affected from severe knee OA thus future studies can be conducted on severe knee OA .
- As it is also seen that most commonly females are affected with knee OA on which the future studies can also be conducted

LIMITATION OF THE STUDY

- The present study have few limitations like shorterduration of treatment like 14 days.
- This study has not taken the severly affected patients of knee OA because in severe conditions it becomes very difficult for the patients to perform exercise.
- During the study it has also been observed that as long as the people are in relation to the therapistor are observed regularly, their consent for exercise is high but if there is no observation, reminder by the therapist then their consent reduces.
- Therefore for the better results to be obtained for effect of exercise a periodically observation is required.

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