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ASSOCIATION BETWEEN POSTURAL BALANCE AND SELF-ESTEEM AMONG POSTMENOPAUSAL WOMEN – A CROSS-SECTIONAL STUDY

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ABSTRACT:

Background: Menopause is the permanent cessation of menstruation and typically occurs in women aged 49–52 years. Postmenopausal women experience hormonal, physical, and psychological changes that adversely affect postural balance and psychosocial well-being, including self-esteem.

Objective: To assess the association between postural balance and self-esteem among postmenopausal women.

Materials and Methods: This observational, cross-sectional study was conducted at ACS Medical College and Hospital, Chennai. A total of 100 postmenopausal women aged 52–70 years were recruited based on predefined inclusion and exclusion criteria. Balance was assessed using the Berg Balance Scale (BBS), and self-esteem was measured using the Rosenberg Self-Esteem Scale (RSES). Data normality was tested with the Shapiro-Wilk test.

Results: In 100 postmenopausal women (mean age 64.3 years, 66% overweight/obese), balance was generally poor 46% at wheelchair-level function, 53% needed assisted ambulation 1% independent balance, while self-esteem was mostly normal (73%) though 25% scored low, 2% scored high self-esteem. Self-esteem correlated moderately positively with balance ($r=0.34$, $p=0.001$); higher self-esteem was linked to better balance, while higher BMI and older age were each linked to worse balance.

Conclusion: These findings highlighted the importance of integrating physical balance assessments with psychological screening in postmenopausal care. Routine balance evaluations, targeted exercise programs, and lifestyle modifications are recommended to reduce fall risk and improve overall well-being in this population.

KEYWORDS: postmenopausal women, postural balance, self-esteem, Berg Balance Scale, Rosenberg Self-Esteem Scale, falls, cross-sectional study

INTRODUCTION

The permanent cessation of menstruation is known as menopause. The diagnosis is established retroactively after a full year without menstruation. The majority of women experience menopause between the ages of 49 and 52 years. When menopause occurs before the age of 40, it is referred to as premature menopause. Approximately one-third of a postmenopausal woman's life occurs in this phase. Depletion of the ovarian follicles, the main source of estrogen, signifies primary ovarian failure [1]. The severity and frequency of the menopausal symptoms vary according to cultural, social, and lifestyle factors. Vasomotor, genitourinary, psychological, musculoskeletal, and sleep disturbances are the most prevalent symptoms, accompanied by insulin resistance, dyslipidemia, and body composition redistribution [2].

The menopausal transition, which typically lasts four years, progresses in early and late phases. It begins with the onset of menstrual irregularity, traditionally defined as a skipped period or an increase in cycle length variability of more than seven days. Loss of estrogen is directly responsible for certain changes such as vaginal dryness, bone demineralization, and hot flashes. Although debatable, aging and menopause appear to be associated with higher rates of dementia and cardiovascular disease.[3] Studies from northern India have reported hypertension and arthritis as postmenopausal health concerns.[4]

As women age, postural balance declines. Among postmenopausal women, loss of balance and increased body sway are significant risk factors for falls. A combination of decreased bone strength and an elevated fall risk accounts for the age-associated rise in osteoporotic fractures.[5] Falls are a serious health concern because of the decreased bone mineral density associated with menopause, increasing the incidence of fractures and fall-related injuries.[6] Falls are the most common unintended cause of death worldwide and rank as the 18th most common cause of disability-adjusted life years in older individuals.[7] Estrogen also improves muscle quality and strength, and its loss negatively impacts postural stability and balance.[8] According to a retrospective cohort study of 2,094 women, the risk of falls for women over 65

is 31.9%.[9].

The Berg Balance Scale (BBS) is a widely used clinical tool to identify fall risk and assess mobility and balance. It comprises 14 tasks, each scored 0–4, yielding a maximum score of 56; scores below 45 suggest a risk of falling.[10] The psychological health of postmenopausal women is significantly influenced by self-esteem, which is affected by family dynamics, lifestyle, and social experience.[11] Women with severe menopausal symptoms report lower self-esteem, and individuals with poor self-esteem are more vulnerable to depression, anxiety, and dissatisfaction.[12] Body shame and decreased psychological health are common in postmenopausal women compared to the reproductive years.[13] This observational study examines the prevalence of balance problems and low self-esteem in postmenopausal women and explores the association between these two domains to inform targeted intervention strategies.

MATERIAL AND METHODS

Study Design And Setting

This observational cross-sectional study was conducted over a period of six months, from June 2025 to November 2025,at the Faculty of Physiotherapy, ACS Medical College and Hospital, and in the surrounding Thiruverkadu area, Chennai, India. The study was approved by the Institutional Ethics Committee. All participants provided written informed consent. Ethical standards were maintained throughout the study.

Participants

A total of 100 postmenopausal women were enrolled based on the following criteria:
Inclusion criteria: women aged 52–70 years with naturally confirmed menopause (absence of menstruation for at least 12 consecutive months), with sufficient cognitive ability to understand the study protocol, and who provided voluntary written informed consent.
Exclusion criteria: women with a history of stroke, recent fractures, sprains, recent surgery, or substance abuse of alcohol or drugs due to the possible effect on physical balance and psychological well-being.

Assessment Tools

Two validated instruments were used:
1. Berg Balance Scale (BBS): A valid and reliable clinical scale extensively used in older populations. The BBS comprises 14 functional tasks (e.g., standing from sitting, turning 360 degrees, picking up an object from the floor, standing with eyes closed). Each task is scored on a 5-point scale (0 = cannot perform to 4 = independent performance), yielding a maximum total score of 56. Higher scores indicate better balance. Scores 41-56 indicate low risk, 21-40 moderate risk,
0-20 high risk.
2. Rosenberg Self-Esteem Scale (RSES): A self-report instrument measuring global self-worth using 10 items on a 4-point Likert scale (strongly disagree to agree strongly). Total scores range from 0 to 30: below 15 denotes low self-esteem, 15–25 indicates moderate self-esteem, and above 25-30 reflects high self-esteem.

Procedure

A brief health screening questionnaire was administered to collect demographic data including age, medical history, current medication use, physical activity level, and history of falls or balance issues. Trained professionals administered the BBS first under close observation, followed by the RSES in a calm, well-lit setting with minimal distraction. Both assessments were completed in a single session. Participants displaying signs of severe balance impairment or significantly low self-esteem were referred for appropriate clinical evaluation.

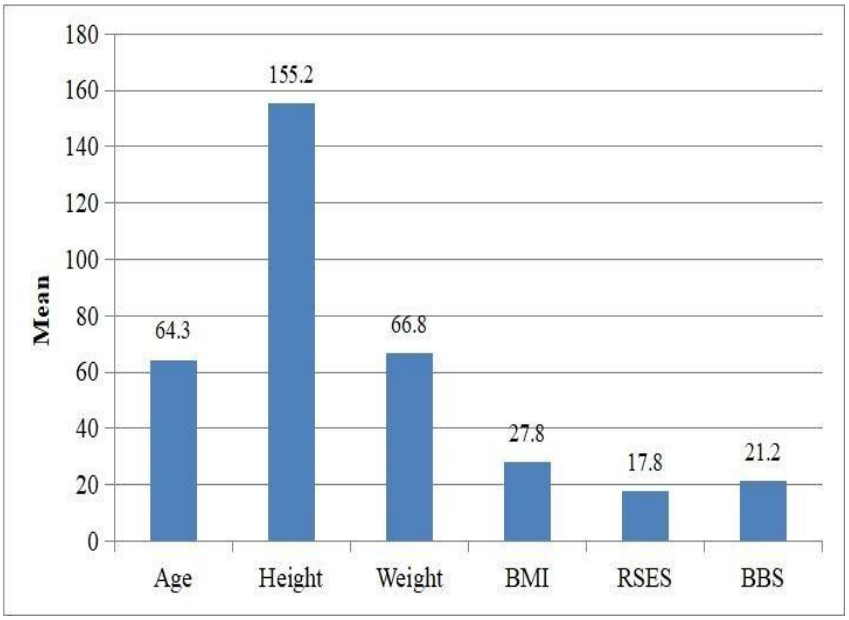
Data Analysis:

The collected data were tabulated and analysed using both descriptive and inferential statistics. All the parameters were assessed using statistical package for social science (SPSS) version 24, with a significance level of p value less than 0.05 and a 95% confidence interval set for all analysis.
Description statistics were used to describe the demographics and clinical status of the subjects. Age, height, weight, Body Mass Index (BMI), Rosenberg Self-Esteem Scale (RSES) scores, and Berg Balance Scale (BBS) scores were all represented in continuous form through their mean, standard deviation, minimum and maximum. On the other hand, categorical variables such as BMI groups, self-esteem groups, and balance groups were described in frequency percentages.
Normality of continuous variables was tested through the Shapiro-Wilk test. Those continuous variables with a p-value > 0.05 were categorized as normally distributed; conversely, those with a p-value < 0.05 were considered as non-normally distributed.
As both Rosenberg Self-Esteem Scale score and Berg Balance Scale score were non-normally distributed and measured on an ordinal scale, a statistical tool used to determine the association between the two variables was the Spearman's Rank Correlation Coefficient (Spearman's rho). Correlation strength was interpreted in the following manner: negligible (0.00-0.19); weak (0.20-0.39); moderate (0.40-0.59); strong (0.60-0.79); and very strong (0.80-1.00).

P value and statistical significance:
Statistical significance was set at a 95% confidence interval, with a p-value of less than 0.05 ($p < 0.05$) being statistically significant.

Table-1: Descriptive Statistics

Variable	Mean	Sd	Minimum	Maximum
Age (years)	64.3	5.3	51	70
Height (cm)	155.2	5.8	145	165
Weight (kg)	66.8	11.2	50	85
BMI (kg/m²)	27.8	5.1	19.3	40.4
Rosenberg Self-Esteem Scale (RSES)	17.8	4.8	7	30
Berg Balance Scale (BBS)	21.2	8.0	6	51

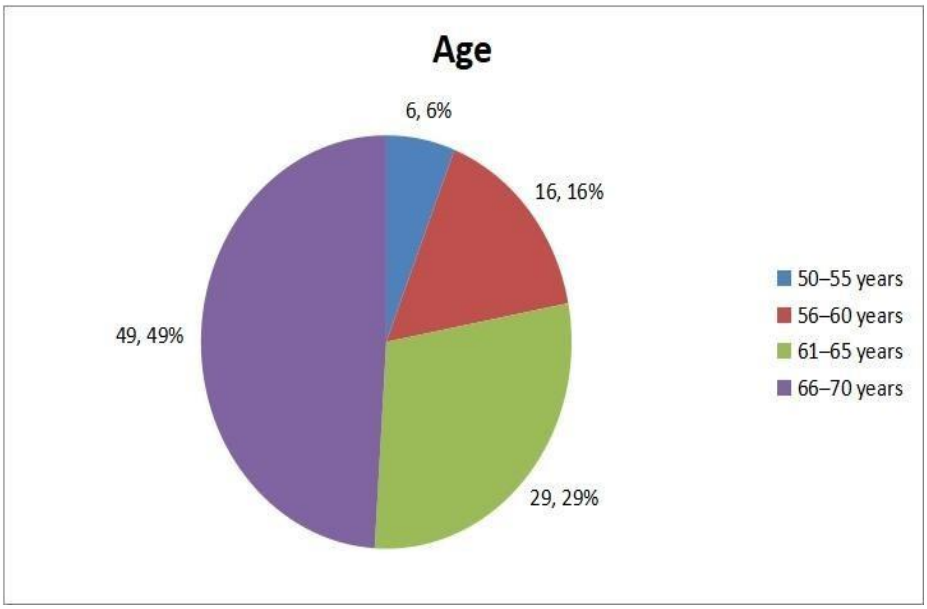


Graph - 1: Descriptive Statistics

Table-2: Age Distribution

Age Group	Frequency	Percentage
50–55 years	6	6%
56–60 years	16	16%
61–65 years	29	29%
66–70 years	49	49%

Mean Age = 64.3 ± 5.3 years.

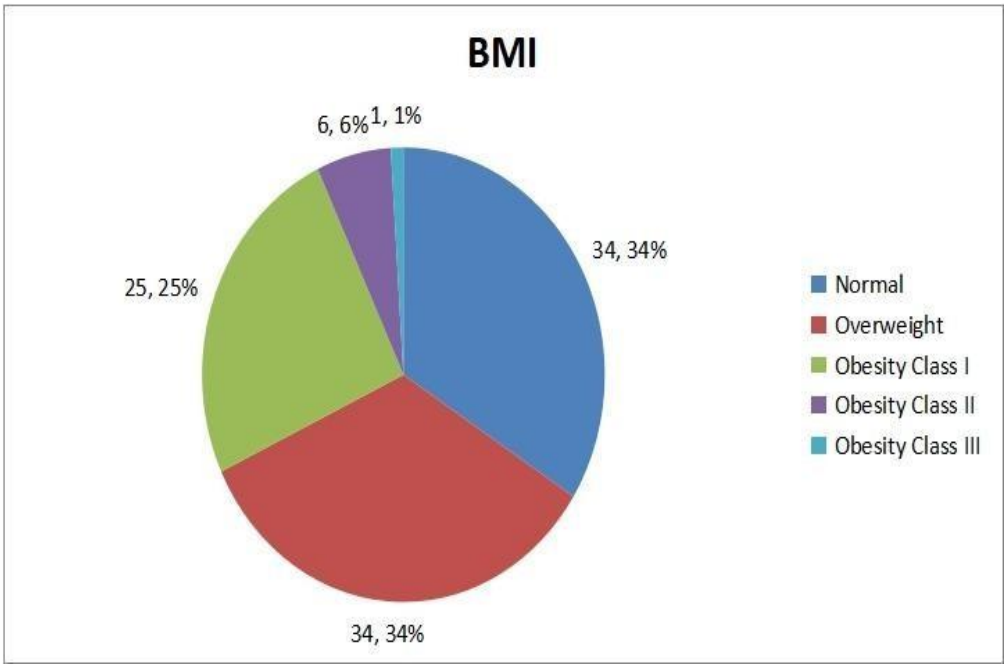


Graph - 2: Age Distribution

Table-3: BMI Classification

BMI Category	BMI	Frequency	Percentage
Normal	18.5–24.9	34	34%
Overweight	25–29.9	34	34%
Obesity Class I	30–34.9	25	25%
Obesity Class II	35–39.9	6	6%
Obesity Class III	≥40	1	1%

Approximately 66% of participants were either overweight or obese.

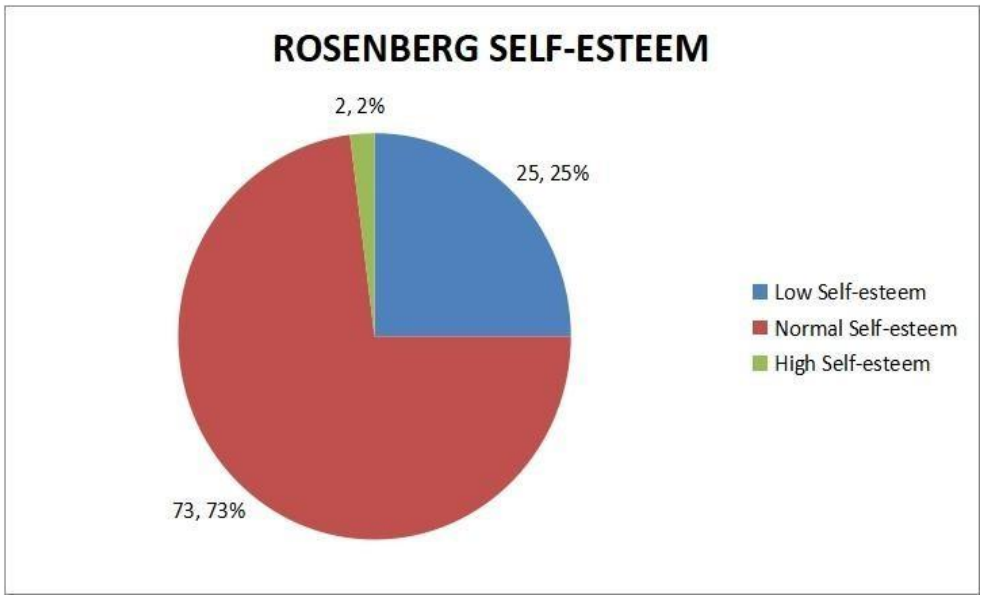


Graph - 3: BMI Classification

Table-4: Rosenberg Self-Esteem

Category	Score	Frequency	Percentage
Low Self-esteem	<15	25	25%
Normal Self-esteem	15–25	73	73%
High Self-esteem	>25	2	2%

Mean RSES Score = 17.8 ± 4.8

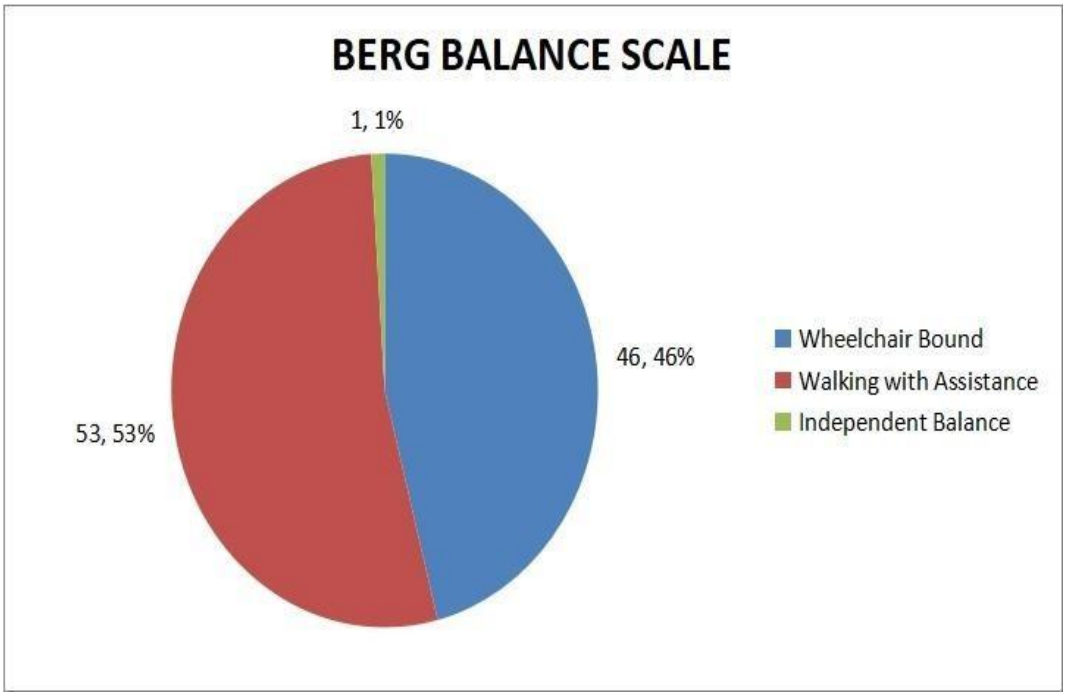


Graph - 4: Rosenberg Self-Esteem

Table-5: Berg Balance Scale

Category	Score	Frequency	Percentage
Wheelchair Bound	0–20	46	46%
Walking with Assistance	21–40	53	53%
Independent Balance	41–56	1	1%

Mean BBS Score = 21.2 ± 8.0



Graph - 5: Berg Balance Scale

Table-6: Shapiro-Wilk Normality

Variable	w Value	p-Value	Distribution
Age	0.9373	0.0001328	Non-normal
BMI	0.9705	0.02416	Non-normal
RSES	0.9901	0.6729	Normal
BBS	0.9624	0.006031	Non-normal

Since RSES and BBS are ordinal scales and usually non-normal, Spearman Rank Correlation is recommended.

Table-7: Correlation Between Rses And Bbs

Variables	Test	Correlation (r)	p-Value
RSES vs BBS	Spearman	0.34	0.001

There was a moderate positive correlation between self-esteem and balance among postmenopausal women ($r = 0.34$, $p = 0.001$). Women with higher self-esteem tended to demonstrate better balance performance

RESULT

A total of 100 postmenopausal women took part in this observational study. The average age of the participants was 64.3 ± 5.3 years; their age ranged from 51 to 70 years. Average height was 155.2 ± 5.8 cm, and average body weight was 66.8 ± 11.2 kg. The average Body Mass Index (BMI) was 27.8 ± 5.1 kg/m², and this suggests that most participants were overweight.

According to the WHO classification of BMI, 34% of the participants had normal body weight, 34% were overweight, 25% were Obesity Class I, 6% were Obesity Class II, and 1% were Obesity Class III. In total, 66% of the participants were either overweight or obese.

Self-esteem level was measured via the Rosenberg Self-Esteem Scale (RSES). The average RSES value was 17.8 ± 4.8; the values varied from 7 to 30. Using the scale classification, 25% of subjects had low self-esteem, 73% of participants had normal self-esteem, and 2% had high self-esteem. Therefore, the results showed that despite the normal self-esteem level in most postmenopausal women, 25% had low self-esteem.

Balance function was assessed using the Berg Balance Scale (BBS), and the mean score was 21.2 ± 8.0, with a range of 6 - 51. As per the BBS scoring system, 46% of subjects had poor balance and could be regarded as being at a wheelchair level of function; 53% had balance function that was suitable for assisted ambulation, while only 1% reached an independent functional balance score level.

The greatest number of participants (49%) were in the age group 66-70 years old; followed by 29% from the 61-65 years age group, 16% from the 56-60 years age group, and 6% from the 50-55 years age group. Thus, the majority of participants were represented by the older postmenopausal age group.

In order to evaluate the normality of continuous data, the Shapiro-Wilk test was conducted. It showed that age and BMI were normally distributed ($p > 0.05$). In contrast, scores on the Rosenberg Self-Esteem Scale (RSES) and Berg Balance Scale (BBS) were not normally distributed ($p < 0.05$). Consequently, non-parametric statistical procedures could be used to analyse the relationships between self-esteem and balance.

The relationship between self-esteem and balance was evaluated with the help of Spearman's rank correlation coefficient. It showed the presence of a moderate positive correlation between RSES and BBS scores ($r = 0.34$, $p = 0.001$), which means that participants with high self-esteem had better balance results.

Moreover, a negative correlation was found between BMI and balance, and consequently participants with higher BMI had worse balance. A negative correlation was also observed between age and balance, which means that balance results worsened with age.

DISCUSSION

This cross-sectional study examined the association between postural balance and self-esteem in 100 postmenopausal women over a six-month period. The findings indicate that both low self-esteem and balance impairment are prevalent and significantly related in this population.

Balance were measured berg balance scale 46% women's had poor balance , 53% women's needed assisted ambulation , 1% women's had independent balance According to Nassen et al 2007 serum estradiol was directly linked to worse postural sway, and hormone therapy improved balance specifically in women with low estradiol [14]The mean BBS score of 21.20 in the present study reflects moderate to severe balance impairment, consistent with these observations.

According to our findings self esteem 25 % women had low self esteem ,75% women's scored normal self esteem , 2% women scored high self esteem . Austin et al. (2007), finding it's driven by balance/mobility impairment and linked to social and psychological risk factors [15] This mechanism may partly explain the moderate self-esteem scores (mean 17.8) observed in the present cohort, suggesting a bidirectional relationship between balance and psychological well-being.

Beverley et al. (2010) reported that combined physical therapy, education, group support, and psychological care provide comprehensive benefits in postmenopausal health.[16] However, many studies remain limited by cross-sectional or short-term designs without longitudinal follow-up. Ramezanzadeh et al. (2024) demonstrated a positive correlation between self-esteem and reduction in menopausal symptoms.[17]

The present study supports the need for holistic treatment of postmenopausal decline. Addressing both physical and psychological dimensions is essential to advance quality of life, lower fall risk, and promote independence. Longitudinal studies exploring the impact of early perimenopause interventions on long-term balance and self-esteem are warranted.

Conclusion

This study demonstrates a significant association between postural balance and self-esteem among postmenopausal women. Participants with better balance tended to report higher self-esteem levels. These findings highlight the importance of integrating physical balance assessments with psychological screening in postmenopausal care. Routine balance evaluations, targeted exercise programs, and lifestyle modifications are recommended to reduce fall risk and improve overall well-being in this population.

Study Limitations

The study has the following limitations:
(1) the sample size was limited to 100 participants
(2) the cross-sectional design does not permit causal inference
(3) an intervention component was not included
(4) confounding factors such as socioeconomic status and confidence levels were not controlled.

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Conflicts Of Interest

There are no conflicts of interest.

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None declared

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