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Prevalence and Associated Factors of Dizziness Among a National Community-Dwelling Sample of Older Adults in India in 2017–2018

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Abstract

Background: This study aimed to determine the prevalence and associated factors of dizziness in older community-dwelling adults in India.

Methods: The cross-sectional sample was composed of 21,343 individuals (≥ 65 years) from the Longitudinal Aging Study in India (LASI) Wave 1 in 2017–2018. Dizziness was assessed by determining if the individuals suffered from “persistent or troublesome dizziness or light headedness” in the past 2 years.

Results: Women and men had the overall prevalence of 14.6%/17.2% and 11.6% in past 2-year dizziness, respectively. Adjusted logistic regression analysis revealed that sociodemographic factors (female sex), physical chronic conditions (angina), geriatric conditions (incontinence and impaired vision), stress and mental health (poor or fair self-rated health, perceived discrimination, neurological or psychiatric problems, insomnia symptoms, persistent headaches, and severe fatigue or exhaustion) and health risk behavior (tobacco use) were positively associated with dizziness.

Conclusions: One in seven older adults in India had past 2-year dizziness. The factors associated with dizziness included female sex, angina, incontinence, impaired vision, poor or fair self-rated health, perceived discrimination, neurological or psychiatric problems, insomnia symptoms, persistent headaches, severe fatigue or exhaustion, and tobacco use.

Keywords: aged, chronic disease, dizziness, India, mental health

INTRODUCTION

Dizziness is a general term to explain the feeling we have when our sense of balance is impaired. Many people who experience dizziness experience difficulty explaining exactly how it makes them feel. For example, some people who feel dizzy, light-headed, giddy, or off-balance describe the feeling as if they or their surroundings are spinning.¹ In a review on 20 studies in the adult population, lifetime prevalence estimates that significant dizziness ranges between 17% and 30%, and vertigo varies between 3% and 10%.² In low- and middle-income countries, among older adults, the prevalence of dizziness is 15.2% in Columbia (≥ 60 years),³ 24.5% in Nigeria,⁴ and 45% in Brazil (N = 391, ≥ 65 years).⁵ In a cross-sectional study in a geriatric outpatient clinic (≥ 65 years) in rural central India, the prevalence of dizziness/vertigo is 3%.⁶ National population-based data on dizziness in India are lacking. Having dizziness may have a great social impact,

as shown in a study on patients suffering from dizziness in England.⁷ With the potentially large social and health impact of dizziness, its prevalence and associated factors in the general older adult population in India should be assessed. Relevant findings can potentially provide a basis for developing health care policies for older adults in India.

Most people with dizziness problems tend to have more than one risk factor, suggesting that dizziness is a multifactorial geriatric syndrome.⁸ Sociodemographic factors associated with dizziness may include increasing age,^{9,10} female sex,^{5,9,11} having health insurance,¹² and living alone.¹³ Physical chronic conditions related to dizziness are hypertension, heart disease,¹² cardiovascular disease,⁹ history of osteo/rheumatoid arthritis,¹³ osteoporosis,⁹ and physical multimorbidity.^{3,9}

Geriatric conditions that increase the odds of dizziness are impaired vision,^{3,11,13} short-sightedness (defined by glasses),⁹ impaired hearing,¹¹ memory disturbance,^{9,14} cognitive impairment,^{3,15} incontinence,⁹ recurrent falls,⁵ falls,^{9,14} impaired function of lower extremities,¹³ mobility problems,⁹ impaired balance,⁸ and use of more than four medications.³

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Stress and mental health factors include the following: poor self-rated health status,^{3,9,12} perceived stresses,¹⁶ and mental and emotional stress¹⁷ are associated with dizziness. Mental health conditions related to dizziness include depression or depressive symptoms,^{3,5,9,12,13} presence of anxiety,¹³ psychological disorders,¹⁵ sleep disorder,⁹ excessive sleepiness,¹⁴ and short sleep.¹⁶ In addition, other health problems linked to dizziness are perceived fatigue,^{5,18} excessive drowsiness,⁵ headaches,¹⁹ and migraine.¹⁰ Furthermore, several health risk behaviors, including physical inactivity,^{18,20,21} no exercise,²² smoking,^{4,16} and alcohol use,¹⁶ are associated with dizziness. However, studies have yet to explore dizziness among community-dwelling older adults in India. As such, this study aimed to determine the prevalence and associated factors of dizziness in older adults in India.

METHODS

Sample and procedures

In this secondary data analysis, data from the cross-sectional and nationally representative “Longitudinal Aging Study in India (LASI) Wave 1, 2017–2018” were utilized; “the overall household response rate is 96%, and the overall individual response rate is 87%.”²³ In a household survey, “interview, physical measurement, and biomarker data were collected from individuals aged 45 and above and their spouses regardless of age,”²³ but the sample was restricted to persons aged ≥ 65 . This study was approved by the “Indian Council of Medical Research Ethics Committee in January 2017, and written or oral informed consent was obtained from the participants.”²³

Measures

Outcome variable

Dizziness was assessed with one question from the Health and Retirement Study on having “persistent or troublesome dizziness or light headedness in the past 2 years” (yes or no).²³

Covariates

Sociodemographic indicators included education level, sex, age, and residential status. The subjective socioeconomic status was sourced from the following item: “Please imagine a 10-step ladder, where the people who were the worst off and had the least money, least education, and worst jobs or no jobs were at the bottom; the people who were the best off and had the most money, most education, and best jobs were at the top of the ladder. Please indicate the number (1–10) on the rung on the ladder where you would place yourself”²³ (defined as 1–3 low, 4–5 medium, and 6–10 high).

Physical chronic conditions were sourced from the following questions: “Has any health professional ever told you that you have...?”: 1) “chronic lung diseases such as asthma,

chronic obstructive pulmonary disease/chronic bronchitis, or other chronic lung problems; 2) chronic heart diseases such as coronary heart disease (heart attack or myocardial infarction), congestive heart failure, or other chronic heart problems; 4) diabetes or high blood sugar; 5) bone or joint disorder (arthritis or rheumatism, osteoporosis, or other bone/joint diseases); and 6) stroke” (yes/no).²³ *Angina* was assessed with the “World Health Organization’s Rose angina questionnaire”²⁴ defined on the basis of “discomfort at walking uphill or hurrying or at an ordinary pace on level ground. Furthermore, the pain should be located at the sternum or in the left chest and arm, causing the patient to stop or slow down, and the pain should resolve within 10 min when the patient stops or slows down.”²⁵ *Hypertension* was defined as “systolic blood pressure (BP) ≥ 140 mm Hg and/or diastolic BP ≥ 90 mm Hg (based on the last two average values of three BP readings) or where the participant is currently on antihypertensive medication.”²⁶

Geriatric conditions consisted of impaired cognition,^{23,27} measured underweight (<18.5 kg/m²), injurious falls (past 2 years), incontinence, self-reported impaired vision, and hearing impairment.²³

Stress and mental health variables

Self-rated health status was sourced from the question: “In general, would you say your health is excellent, very good, good, fair, or poor?” Responses were coded as “1 = poor, 2 = fair, 3 = good, 4 = very good, and 5 = excellent.”²³

The assessed *life event stressors* included 1) victims of violent crime (“In the last 12 months, have you been the victim of a violent crime, such as assault/mugging/threat to life/others?” (yes/no), 2) disaster exposure causing health effects (“In the last 5 years, has your health been severely affected by disasters such as floods, landslides, extreme cold and hot weather, cyclones/typhoons, droughts, earthquakes, tsunamis, or any other natural calamities?” (yes/no), and 3) man-made incident causing health effects (“In the last 5 years, has your health been severely affected by man-made incidents such as riots, terrorism, building collapses, fires, traffic accidents, or any other man-made incidents?” (yes/no).²³ Any affirmative response was coded with 1, and if no affirmative was coded 0.

Perceived discrimination was sourced from the Everyday Discrimination Scale (EDS) (short version).²⁸ Cronbach’s alpha for the EDS in this study was 0.86.

Neurological or psychiatric disorder (health care provider diagnosed any neurological/ psychiatric problems) (Yes, No).²³

Major depressive disorder was evaluated with the “Composite International Diagnostic Interview short form (CIDI-SF).”^{29,30} Study respondents were required to “endorse either anhedonia or depressed mood for most

of the day for most of a 2-week period or more," and those who fulfilled this criterion "completed an additional seven symptoms: lost interest, feeling tired, change in weight, trouble with sleep, trouble concentrating, feeling down, and thoughts of death."³¹ "Those with a score of ≥ 3 were considered to meet the criteria for having MDD in the previous 12 months;^{31,32} MDD symptomology scores ranged from 0 to 7."³¹

Insomnia symptoms were assessed with four questions adapted from the Jenkins Sleep Scale (JSS-4)³³: "How often do you have trouble falling asleep?" 2) "How often do you have trouble with waking up during the night?" 3) "How often do you have trouble with waking up too early and not being able to fall asleep again?" 4) "How often did you feel unrested during the day regardless of the number of hours of sleep you had?" Response options were "never, rarely (1–2 nights per week), occasionally (3–4 nights per week), and frequently (5 or more nights per week)" (item four was reverse coded). Insomnia problems were "coded as 'frequently' for any of the four symptoms as one."³⁴ "JSS-4 proved excellent reliability and demonstrated good construct validity."³⁵ The internal consistency of JSS-4 was 0.87 in this study.

The *loneliness* question used was sourced from the CES-D-10³⁶: "How often did you feel alone in the past week?" Response options were coded into "no loneliness: 0 = rarely or none at all (<1 day), sometimes, or 1–2 days/week and 1 = occasionally, all the time, or 3–7 days/week."

Persistent headaches and severe fatigue or exhaustion were assessed on the basis of the HRS questions with an affirmative response to the following question: "Have you had any of the following persistent or troublesome problems in past 2 years?" 1) Persistent headaches and 2) severe fatigue or exhaustion (yes/no).²³

Current tobacco use was assessed as follows: 1) "Do you currently smoke any tobacco products (cigarettes, bidis, cigars, hookah, cheroot, etc.)?" and 2) Do you use smokeless tobacco (such as chewing tobacco, gutka, pan masala, etc.)?²³

Heavy episodic alcohol use was assessed with the following question: "In the last 3 months, how frequently have you had at least five or more drinks on one occasion?"²³ and defined as "1–3 days per month, 1–4 per week, five or more days per week, or daily."

Physical activity was assessed with the following questions: 1) "How often do you participate in sports or vigorous activities, such as every day, more than once a week, once a week, 1–3 times a month, or hardly ever or never?" 2) "On the days you did vigorous activity, how much time did you usually spend doing any vigorous activity? (___min)", 3) "How often do you take part in sports or activities that

are moderately energetic such as...?" and 4) "How much time did you usually spend doing any moderate activity on average in a day?"²³ The participants were classified to be having a high physical activity as follows: ">300 min/week moderate physical activity or ">150 min/week vigorous intensity or >300 min/week moderate + vigorous intensity; whereby time in vigorous activity is doubled").^{37,38}

Data analysis

Descriptive statistics was applied to describe sociodemographic and health information. Univariate and multiple logistic regressions were conducted to estimate the associations between sociodemographic factors, physical chronic conditions, geriatric conditions, stress and mental health, and health risk behavior variables with dizziness (dependent variable). The variables significant in univariate logistic regression analysis were subsequently included in the multiple logistic regression models. Only complete cases were considered for the analysis, and data were significant if $p < 0.05$. Statistical analyses were conducted by using "STATA software version 15.0 (Stata Corporation, College Station, TX, USA)" and considering the multistage sampling and weighting of data.

RESULTS

Sample characteristics

The sample included 21,343 older adults (≥ 65 years, median 70 years). Among them, 52.5% were women, and 47.5% were men. The majority (70.4%) of the study participants lived in rural areas, 39.6% had a low subjective socioeconomic status, and 58.8% had no schooling. Furthermore, 20.9% had a bone/joint disease, 5.7% heart disease, 5.7% chronic lung disease, 14.5% diabetes, 3.0% stroke, 9.3% angina, and 51.8% hypertension. Regarding geriatric conditions, 28.4% were underweight, 5.6% had a history of falls, 10.9% impaired cognition, 4.7% incontinence, 15.5% impaired vision, and 11.3% impaired hearing. In addition, 51.2% rated their health as poor or fair, 9.2% suffered from life stressors, and 17.7% experienced discrimination. Approximately 8.2% had major depressive disorder, 2.9% had a neurological or psychiatric problem, 15.3% had insomnia symptoms, 15.5% had loneliness, 12.3% had persistent headaches, and 24.8% had severe fatigue or exhaustion. Moreover, 33.0%, 2.3%, and 47.6% used tobacco, had heavy alcohol, and moderately engaged in high physical activity, respectively. The past 2-year dizziness had overall prevalence of 14.6%/17.2% among women and 11.6% among men (Table 1).

Associations with dizziness

In multiple logistic regression analysis, sociodemographic factors (female sex), physical chronic conditions (angina), geriatric conditions (incontinence, and impaired vision), stress and mental health (poor or fail self-rated health, perceived discrimination, neurological or psychiatric problems, insomnia symptoms, persistent headaches,

and severe fatigue or exhaustion), and health risk behavior (tobacco use) were positively associated with dizziness (Table 2). In univariate logistic regression analysis, no schooling was positively related to dizziness, whereas higher socioeconomic status and urban residence were negatively associated with dizziness.

Stroke, chronic lung disease, bone or joint disorders, injurious falls, impaired cognition, underweight, impaired hearing, exposure to life stressors, major depressive disorder, and loneliness were positively linked to dizziness, whereas a high physical activity was negatively associated with dizziness (Table 1).

TABLE 1. Sample and dizziness characteristics and univariate logistic regression results among older adults (≥ 65 years) in India, 2017–2018 (N = 21,343)

Variables	Sample %	Dizzy %	Not dizzy %	Odds Ratio (95% CI)	<i>p</i>
Sociodemographic factors					
All		14.6	85.4		
Age in years					
65–74	67.9	66.4	68.2	1 (Reference)	
75–84	25.2	26.7	25.0	1.10 (0.96, 1.26)	0.128
85 plus	6.9	6.9	6.8	1.03 (0.80, 1.33)	0.795
Sex					
Male	47.5	37.9	49.1	1 (Reference)	
Female	52.5	62.1	50.9	1.58 (1.39, 1.79)	<0.001
Education					
≥ 1 year	41.2	32.4	42.7	1 (Reference)	
No schooling	58.8	67.6	57.3	1.55 (1.35, 1.79)	<0.001
Socioeconomic status					
Low	39.6	46.0	38.5	1 (Reference)	
Medium	36.0	35.2	36.2	0.81 (0.69, 0.96)	0.016
High	24.3	18.7	25.3	0.62 (0.51, 0.75)	<0.001
Residential status					
Rural	70.4	77.3	69.2	1 (Reference)	
Urban	29.6	22.7	30.8	0.66 (0.54, 0.81)	<0.001
Health factors					
Physical chronic conditions					
Hypertension	51.8	54.8	51.3	1.15 (0.99, 1.34)	0.064
Heart disease	5.7	6.4	5.5	1.17 (0.83, 1.66)	0.370
Angina	9.3	14.8	8.4	1.89 (1.56, 2.30)	<0.001
Stroke	3.0	4.0	2.8	1.47 (1.10, 1.96)	0.010
Chronic lung disease	5.7	6.4	5.5	1.52 (1.20, 1.92)	<0.001
Bone or joint disorder	20.9	27.2	19.8	1.51 (1.23, 1.86)	<0.001
Diabetes	14.5	14.8	14.4	1.03 (0.79, 1.33)	0.837
Geriatric conditions					
Injurious falls	5.6	8.9	5.1	1.81 (1.41, 2.33)	<0.001
Impaired cognition	10.9	15.2	10.2	1.58 (1.26, 1.97)	<0.001
Underweight	28.4	34.0	27.5	1.35 (1.17, 1.57)	<0.001
Incontinence	4.7	10.0	3.8	2.80 (2.24, 3.51)	<0.001
Impaired vision	15.5	25.0	13.8	2.08 (1.73, 2.49)	<0.001
Impaired hearing	11.3	14.0	10.8	1.35 (1.09, 1.66)	0.005
Stress and mental health					
Poor or fair self-rated health	51.2	65.2	48.9	1.96 (1.69, 2.28)	<0.001
Life stressors	9.2	12.7	8.6	1.54 (1.27, 1.88)	<0.001
Perceived discrimination					
0	82.3	76.8	83.2	1 (Reference)	
1–2	11.0	11.7	10.9	1.16 (0.92, 1.47)	0.216
3–6	6.7	11.5	5.9	2.11 (1.70, 2.64)	<0.001

Table 1. continues

Variables	Sample %	Dizzy %	Not dizzy %	Odds Ratio (95% CI)	p
Neurological or psychiatric disorder	2.9	5.9	2.5	2.47 (1.72, 3.55)	<0.001
Major depressive disorder	8.2	14.1	7.2	2.12 (1.73, 2.59)	<0.001
Insomnia symptoms	15.3	28.3	13.1	2.61 (2.25, 3.02)	<0.001
Loneliness	15.5	20.3	14.7	1.47 (1.19, 1.82)	<0.001
Persistent headaches	12.3	31.8	8.9	4.76 (4.01, 5.66)	<0.001
Severe fatigue or exhaustion	24.8	54.8	19.7	4.92 (4.30, 5.64)	<0.001
Health risk behavior					
Current tobacco use	33.0	36.4	32.4	1.19 (1.05, 1.36)	0.007
Heavy alcohol use	2.3	2.5	2.3	1.11 (0.77, 1.62)	0.572
Physical activity					
None	38.1	42.8	37.3	1 (Reference)	
Low	14.3	14.0	14.3	0.85 (0.69, 1.05)	0.133
Moderate	8.4	7.5	8.6	0.76 (0.56, 1.04)	0.089
High	39.2	35.7	39.8	0.78 (0.64, 0.95)	0.014

TABLE 2. Multiple logistic regression with dizziness among older adults (≥65 years) in India, 2017–2018

Variables	Adjusted Odds Ratio (95% CI)	p
Sociodemographic factors		
Sex		
Male	1 (Reference)	
Female	1.54 (1.29, 1.84)	<0.001
Education		
≥1 year	1 (Reference)	
No schooling	1.04 (0.86, 1.26)	0.671
Socioeconomic status		
Low	1 (Reference)	
Medium	1.01 (0.83, 1.23)	0.898
High	0.94 (0.75, 1.18)	0.599
Residential status		
Rural	1 (Reference)	
Urban	0.83 (0.69, 1.01)	0.067
Health factors		
Physical chronic conditions		
Angina	1.48 (1.15, 1.49)	0.002
Stroke	1.33 (0.86, 2.06)	0.201
Chronic lung disease	1.14 (0.88, 1.47)	0.336
Bone or joint disorder	1.13 (0.93, 1.38)	0.226
Geriatric conditions		
Injurious falls	1.24 (0.91, 1.69)	0.168
Impaired cognition	1.03 (0.79, 1.34)	0.817
Underweight	1.16 (0.97, 1.39)	0.103
Incontinence	1.54 (1.13, 2.10)	0.006
Impaired vision	1.43 (1.13, 1.82)	0.003
Impaired hearing	1.15 (0.89, 1.48)	0.271
Stress and mental health		
Poor or fair self-rated health	1.28 (1.08, 1.53)	0.005
Life stressors	1.08 (0.82, 1.42)	0.579

Table 2. continues

Variables	Adjusted Odds Ratio (95% CI)	p
Perceived discrimination		
0	1 (Reference)	
1-2	0.80 (0.60, 1.07)	0.130
3-6	1.47 (1.10, 1.96)	0.009
Neurological or psychiatric disorder	1.59 (1.08, 2.36)	0.020
Major depressive disorder	1.15 (0.88, 1.50)	0.317
Insomnia symptoms	1.73 (1.40, 2.13)	<0.001
Loneliness	1.06 (0.85, 1.33)	0.611
Persistent headaches	2.81 (2.32, 3.41)	<0.001
Severe fatigue or exhaustion	3.11 (2.62, 3.69)	<0.001
Health risk behavior		
Current tobacco use	1.26 (1.05, 1.51)	0.013
Physical activity		
None	1 (Reference)	
Low	0.98 (0.77, 1.24)	0.867
Moderate	0.82 (0.62, 1.10)	0.187
High	0.99 (0.81, 1.21)	0.917

DISCUSSION

This study was the first to evaluate the prevalence and associated factors of dizziness among older adults in India. The past 2-year prevalence of dizziness (14.6%) was similar to that in a community-based study in Columbia (past 1 month, 15.2%, ≥ 60 years)³ but lower than that in Nigeria (past 1 month, 24.5%, ≥ 65 years)⁴ and Brazil (past 1 year, 45%, ≥ 65 years).⁵ Conversely, it was higher than that in a geriatric outpatient clinic in India (3%).⁶

Consistent with several studies,^{5,9,11} our study showed that female sex was associated with dizziness. Some studies have found an increase in the prevalence of dizziness with age,^{9,10} but we did not find differences in the prevalence of dizziness by age group. Consistent with previous studies,^{9,12,13} our findings revealed that physical chronic conditions (angina, and in unadjusted analysis heart disease, stroke, chronic lung disease, and bone or joint disorder) were associated with dizziness. Furthermore, our results agreed with previous studies,^{3,5,9,11,13-15} which demonstrated that several geriatric conditions (incontinence, impaired vision, and in unadjusted analysis, injurious falls, impaired cognition, underweight, and impaired hearing) were positively associated with dizziness.

In terms of stress and mental health, poor or fair self-rated health was associated with perceived discrimination, neurological or psychiatric problems, insomnia symptoms, persistent headaches, severe fatigue or exhaustion, and dizziness. These results were consistent with previous findings.^{3,5,9,10,12,14,16,18,19} Regarding the association between insomnia symptoms and dizziness, Kim *et al.*³⁹ suggested that "it is important to consider sleep disturbance in patients with

psychogenic dizziness, such as phobic postural vertigo and chronic subjective dizziness, or nonspecific dizziness." Furthermore, evidence has emerged that "psychotherapy may be effective in patients with dizziness that is medically not sufficiently explained or due to a psychiatric disorder."⁴⁰

High associations were found between severe fatigue or exhaustion, persistent headaches, and dizziness, indicating that these symptoms may be precipitants of dizziness;⁴¹ therefore, dizziness has multifactorial nature.⁸ In a study among patients with chronic dizziness, dizziness is correlated with general fatigue and headache.⁴² Other studies have suggested that fatigue and dizziness co-occur with common underlying processes, such as increased inflammation, but correlation was 0.29 in this study.⁵ In contrast to a previous study that found an association between depression and dizziness,^{3,5,9,12,13} our study observed such an association in univariate analysis.

Several studies have shown an association between physical inactivity and dizziness,^{18,20-22} whereas our study demonstrated that a high physical activity was protective against dizziness in unadjusted analysis. Some studies have suggested that physical therapy may be potentially effective for older people with dizziness, vertigo, and balance disorders.⁴³ In several studies,^{4,16,44} current tobacco use was associated with dizziness in this study. Emerging evidence has indicated that possible genetic variants increase vulnerability to dizziness while smoking.^{44,45}

This study was limited by the assessment of some variables via a self-reporting and cross-sectional study design. The type of dizziness and positions or activities associated with dizziness was not assessed. Some

geriatric conditions, such as medication use (prescription and nonprescription), delirium, and frailty, were not examined.

CONCLUSIONS

One in seven older adults in India had past 2-year dizziness. Dizziness was related to several factors, namely, female sex, angina, incontinence, impaired vision, poor or fair self-rated health, perceived discrimination, neurological or psychiatric problems, insomnia symptoms, persistent headaches, severe fatigue or exhaustion, and tobacco use. The prevalence of dizziness among community-dwelling older adults is high and significantly associated with potentially remediable physical, mental, and social conditions. Therefore, policies for elderly care in India should be formulated.

CONFLICT OF INTEREST

The authors have no conflicts of interest to declare.

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