Research Article

Mountain Heights and Aging Insights: A Comprehensive Geriatric Assessment and Its Correlates in a Mesmerizing Hilly City of Northern India

Dr. Amit Sachdeva[1*], Dr Durgesh Thakur[2] & Mr. Nasim Ahmed[3]

[1]Assistant Professor, Department of Community Medicine Indira Gandhi Medical College, Shimla, Himachal Pradesh, India
[2]Associate Professor, Department of Community Medicine, Shri Lal Bahadur Shastri Govt. Medical College & Hospital, Mandi at Near Chowk, Himachal Pradesh, India
[3]Research Scholar, iARCON International LLP, India
*Corresponding Author: Dr. Amit Sachdeva; Email: dramitsachdeva2410@gmail.com

*Abstract: **Background:*** The elderly population is vulnerable to a range of physical, cognitive, psychosocial, and nutritional issues, compounded by the difficult terrain and limited healthcare infrastructure. This study aims to provide a comprehensive assessment of the health status of older adults in Shimla using the Comprehensive Geriatric Assessment (CGA) to better understand their multifaceted health needs and identify areas for targeted intervention. ***Material & Methods:*** A community-based cross-sectional study was conducted between January and June 2023 in Shimla, including 408 participants aged 60 years and above, selected through stratified random sampling. Data were collected using a semi-structured questionnaire assessing socio-demographic characteristics, medical history, functional abilities, cognitive function, psychosocial well-being, nutritional status, and polypharmacy. Standardized tools such as the Mini-Mental State Examination (MMSE), Geriatric Depression Scale (GDS), Mini Nutritional Assessment (MNA), and fall risk assessments were employed. Data were analyzed using Microsoft Excel and Epi Info version 7.2. ***Results:*** The study revealed a high prevalence of chronic conditions, including hypertension (26%), arthritis (38%), and diabetes (20%). Most participants were independent in basic Activities of Daily Living (ADLs), but a notable proportion required assistance with Instrumental Activities of Daily Living (IADLs), particularly managing finances (47%) and meal preparation (42%). Cognitive decline was detected in 9% of participants, and significant levels of depression (31%) and anxiety (28%) were reported. Nutritional assessments showed that 17% were at risk of malnutrition, and 22% experienced unintentional weight loss. Fall risks were substantial, with 39-42% of participants at low to moderate risk and 11% at high risk. Polypharmacy was common, with 95% of participants using multiple medications, and 33% reported missed doses or poor medication adherence. ***Conclusion:*** This study highlights the pressing health challenges faced by older adults in Shimla, emphasizing the need for integrated, community-based healthcare interventions. The high prevalence of chronic diseases, cognitive impairment, psychosocial distress, malnutrition, and fall risks calls for a multidisciplinary approach to care that addresses the physical, cognitive, and psychosocial needs of the elderly

Keywords: Aging, Geriatric Assessment, Chronic Diseases, Cognitive Function, Psychosocial Well-being, Malnutrition, Falls, Polypharmacy, Shimla, Elderly

INTRODUCTION

The global population is experiencing a significant demographic shift, with the proportion of older adults growing at an unprecedented rate. This aging population presents unique challenges to healthcare systems worldwide, particularly in addressing the multifaceted needs of older individuals. In India, where the elderly population is increasing rapidly, the healthcare system faces the added complexity of managing chronic diseases, cognitive decline, and psychosocial issues among older adults. These challenges are further compounded by geographical, cultural, and socio-economic factors, especially in regions with difficult terrain and limited access to healthcare services.[1-4]

Aging is associated with a range of health concerns, including physical, cognitive, psychosocial, and nutritional issues that require comprehensive, multidisciplinary care. One of the most effective

tools for understanding and addressing these issues is the Comprehensive Geriatric Assessment (CGA). The CGA evaluates the medical, cognitive, functional, and psychosocial domains of older adults, offering insights that enable tailored healthcare interventions. This holistic approach is particularly important in India, where geriatric healthcare remains underdeveloped and under-resourced, despite the increasing need for age-specific services.[4-6]

In this context, Shimla, a hilly city located in northern India, provides a unique backdrop for studying the complexities of aging. The city's challenging topography, cultural richness, and distinct lifestyle factors influence the health outcomes of its older population. These factors, combined with the city's limited healthcare infrastructure, present a compelling case for an in-depth study of the geriatric population in this region. This study aims to provide a comprehensive understanding of the health status of older adults in Shimla through the lens of CGA. Specifically, it seeks to examine the prevalence of chronic medical conditions, assess functional and cognitive abilities, evaluate medication adherence, and explore the psychosocial and nutritional well-being of the elderly. By analyzing these domains, the study will offer valuable insights into the healthcare needs of older adults in Shimla, highlighting the urgent requirement for targeted interventions and enhanced healthcare services in hilly regions of India.

Aims & Objectives
The primary aim of this study is to comprehensively assess the health status of older adults residing in Shimla, a hilly city in Northern India, using the Comprehensive Geriatric Assessment (CGA). The study seeks to provide insights into the multifaceted challenges faced by this population, particularly in relation to chronic medical conditions, functional abilities, cognitive function, psychosocial well-being, and nutritional status. The specific objectives of the study are:

1. **To determine the prevalence of chronic medical conditions** among older adults, such as hypertension, diabetes, heart disease, and arthritis.
2. **To assess the functional abilities** of older adults using validated tools for Activities of Daily Living (ADLs) and Instrumental Activities of Daily Living (IADLs).
3. **To evaluate the cognitive function** of the elderly population by employing cognitive assessment tools such as the Mini-Mental State Examination (MMSE), Montreal Cognitive Assessment (MoCA), and Clock Drawing Test.
4. **To investigate the psychosocial well-being** of older adults, including the prevalence of depression and anxiety, and evaluate social support using standardized scales like the Geriatric Depression Scale (GDS) and the Lubben Social Network Scale.
5. **To assess the nutritional status** of the geriatric population, identifying malnutrition risks and dietary concerns using the Mini Nutritional Assessment (MNA), Malnutrition Universal Screening Tool (MUST), and Subjective Global Assessment (SGA).
6. **To explore medication usage and adherence patterns**, including potential interactions, dosage accuracy, and polypharmacy, to better understand medication management among older adults.
7. **To evaluate the fall risk and mobility challenges** of the elderly population, identifying key factors contributing to fall risks and proposing preventive interventions.

MATERIAL & METHODOLOGY
Study Design
This study was designed as a community-based cross-sectional study conducted in the municipal limits of Shimla city, Northern India. The study aimed to gather comprehensive data on the geriatric population's health status over a six-month period, from January 2023 to June 2023.

Study Area and Population
The study was conducted within the municipal limits of Shimla city, a region characterized by challenging hilly terrain and a distinct lifestyle. Participants aged 60 years and above, residing in Shimla, were included in the study. The total population was stratified by municipal wards, and participants were selected through stratified random sampling.

Sample Size
The sample size was calculated based on the assumption that 50% of the elderly population would have at least one chronic morbidity, with a confidence interval of 95% and an absolute precision of 5%. After accounting for a non-response rate of 10%, the final estimated sample size was 408 participants.

Sampling Technique
The stratified random sampling method was employed to ensure representation across all 34 municipal wards of Shimla. From each ward, 12

participants were randomly selected. The process started at the geographical center of each ward and proceeded in an anticlockwise direction until the required sample size was achieved. In households with more than one eligible elderly participant, one was randomly selected.

Inclusion and Exclusion Criteria
- **Inclusion Criteria**: Adults aged 60 years and above, permanent residents of Shimla.
- **Exclusion Criteria**: Individuals who were terminally ill, bedridden, or who did not provide informed consent were excluded from the study.

Study Tool
Data collection was done using a semi-structured questionnaire that was designed based on established geriatric health assessment tools. The questionnaire included sections on socio-demographic characteristics, medical history, functional and cognitive assessments, psychosocial well-being, nutritional status, and polypharmacy.

Assessment Tools
1. **Medical History**: Reviewed using self-reports and medical records.
2. **Functional Assessment**: Evaluated through Activities of Daily Living (ADLs) and Instrumental Activities of Daily Living (IADLs).
3. **Cognitive Assessment**: Utilized standardized tests such as the Mini-Mental State Examination (MMSE), Montreal Cognitive Assessment (MoCA), and Clock Drawing Test.
4. **Psychosocial Assessment**: Assessed using the Geriatric Depression Scale (GDS), Geriatric Anxiety Inventory (GAI), Lubben Social Network Scale, and Duke Social Support Index.
5. **Nutritional Assessment**: Conducted using the Mini Nutritional Assessment (MNA), Malnutrition Universal Screening Tool (MUST), and Subjective Global Assessment (SGA).
6. **Physical Examination**: Included vital signs, anthropometric measurements, sensory impairments, musculoskeletal assessments, and fall risk assessments.
7. **Polypharmacy Assessment**: Focused on medication usage, dosage, potential interactions, adherence, and storage practices.

Ethical Considerations
Ethical approval was obtained from the Institutional Ethics Committee of Indira Gandhi Medical College, Shimla. Informed written consent was obtained from all participants. Confidentiality was strictly maintained throughout the study, and participants were assured that their information would be used solely for research purposes.

Statistical Analysis
The collected data were entered into Microsoft Excel and analyzed using Epi Info version 7.2. Descriptive statistics, such as frequencies and percentages, were used to summarize the data. Inferential statistics were employed to identify significant associations between variables.

RESULTS
The study population consisted primarily of adults aged 60 to 70 years (78%), with a balanced gender distribution of 46% male and 54% female. A significant proportion of the participants were married (78%), with 17% widowed and 5% divorced or separated. Most participants lived with family members (94%), while a small fraction (6%) lived alone. Educational attainment showed that 16% of participants were illiterate, while 43% had completed high school or less. Around 19% reached the senior secondary level, 17% had a bachelor's degree, and 5% held a master's or doctorate. In terms of employment status, 72% were retired, while 20% were still employed, and 8% were unemployed, reflecting the retired nature of the older adult population in Shimla.

Table 1: Socio-Demographic Characteristics of Study Participants

Variable	Category	Percentage (%)
Age Group (Years)	60-70	78%
	71-80	14%
	81 and above	8%
Gender	Male	46%
	Female	54%
Marital Status	Married	78%
	Widowed	17%
	Divorced/Separated	5%
Living Arrangements	Alone	6%
	With Family	94%
Educational Status	Illiterate	16%
	High School or Less	43%
	Senior Secondary	19%
	Bachelor's Degree	17%
	Master's/Doctorate	5%
Employment Status	Employed	20%
	Retired	72%
	Unemployed	8%

Chronic medical conditions were prevalent among the older adults in Shimla, with 26% diagnosed with hypertension, 20% with diabetes, and 17% suffering from heart disease. Arthritis was the most common chronic condition, affecting 38% of participants, while respiratory disorders were present in 12%. Additionally, 18% reported having been hospitalized in the past year, and 8% had undergone recent surgeries. Medication use was high, with 76% of participants regularly taking medications, and 22% had experienced allergies or adverse reactions. A notable proportion also reported a family history of cardiovascular disease (42%) and diabetes (23%). Importantly, 74% of participants were up-to-date with immunizations, including COVID-19 vaccines.

Table 2: Prevalence of Chronic Medical Conditions and Medical History

Chronic Condition / History	Prevalence (%)
Hypertension	26%
Diabetes	20%
Heart Disease	17%
Arthritis	38%
Respiratory Disorders	12%
Recent Hospitalizations (Past Year)	18%
Recent Surgeries	8%
Medication Use (Any Type)	76%
Allergies or Adverse Reactions	22%
Family History of Cardiovascular Disease	42%
Family History of Diabetes	23%
Up-to-Date on Immunizations (Including COVID-19)	74%

The majority of participants were independent in performing basic Activities of Daily Living (ADLs). For example, 91% of participants were able to bathe independently, 93% could dress and groom themselves, and 92% were self-sufficient in toileting. Similarly, 94% could transfer and move about independently, and 93% were capable of feeding themselves. Mobility, an important functional domain, was intact in 94% of participants. Only a small percentage required assistance with these daily activities, indicating a relatively high level of functional independence among the elderly population in Shimla.

Table 3: Functional Assessment – Activities of Daily Living (ADLs)

Activity	Independent (%)	Needs Assistance (%)
Bathing	91%	9%
Dressing & Grooming	93%	7%
Toileting	92%	8%
Transferring & Moving About	94%	6%
Feeding	93%	7%
Mobility (Walking/Moving Around)	94%	6%

Instrumental Activities of Daily Living (IADLs), which assess more complex tasks essential for independent living, showed more participants needing assistance compared to basic ADLs. About 72% of participants were able to shop for groceries independently, while 28% needed help. Similarly, 58% could prepare meals on their own, but 42% required assistance. Managing medications independently was possible for 67% of participants, while 33% needed help. Managing finances was more challenging, with 47% requiring assistance. These findings highlight that while participants were generally independent in basic ADLs, a notable proportion needed support with IADLs, which may affect their ability to live fully independently.

Table 4: Functional Assessment – Instrumental Activities of Daily Living (IADLs)

Activity	Independent (%)	Needs Assistance (%)
Grocery Shopping	72%	28%
Meal Preparation	58%	42%
Managing Medications	67%	33%
Managing Finances	53%	47%

The cognitive function of participants was assessed using the Mini-Mental State Examination (MMSE), Montreal Cognitive Assessment (MoCA), and Clock Drawing Test. According to the MMSE, 91% of participants had normal cognition, but 5% exhibited mild cognitive impairment, and 3% had moderate impairment. Severe cognitive impairment was rare, affecting only 1%. The MoCA results mirrored these findings, with 85% showing normal cognition, 9% having mild impairment, and 4% presenting moderate impairment. The Clock Drawing Test, a specific task for assessing visuospatial and executive function, indicated that 6% of participants had significant cognitive impairment. Overall, cognitive decline was present in a small but important subset of the population, warranting further attention to cognitive health in this age group.

Table 5: Cognitive Assessment Results (MMSE, MoCA, and Clock Drawing Test)

Cognitive Function Test	Score Range	Prevalence (%)
Mini-Mental State Examination (MMSE)	Normal Cognition (≥ 24)	91%
	Mild Cognitive Impairment (19-23)	5%
	Moderate Cognitive Impairment (10-18)	3%
	Severe Cognitive Impairment (≤ 9)	1%
Montreal Cognitive Assessment (MoCA)	Normal Cognition (≥ 26)	85%
	Mild Cognitive Impairment (18-25)	9%
	Moderate Cognitive Impairment (10-17)	4%
Clock Drawing Test	Cognitive Impairment (Score ≤ 5)	6%

Psychosocial assessments revealed that 31% of participants were experiencing depression based on the Geriatric Depression Scale (GDS), and 28% showed signs of anxiety according to the Geriatric Anxiety Inventory (GAI). Social support, an important determinant of psychosocial health, was measured using the Lubben Social Network Scale and Duke Social Support Index. Around 25-26% of participants reported low levels of social engagement, while 74% were socially engaged. Participants rated the level of feeling loved and cared for by relatives and friends at an average of 44.8 on a 100-point scale. These findings highlight the need for mental health interventions and increased social support for a significant portion of the elderly population.

Table 6: Psychosocial Well-being and Social Support

Psychosocial Measure	Assessment Range	Prevalence (%)
Geriatric Depression Scale (GDS)	Depression (Score 5-9)	31%
Geriatric Anxiety Inventory (GAI)	Anxiety (Score 8-15)	28%
Social Support – Lubben Social Network Scale	Low Social Engagement (<12)	25-26%
	Socially Engaged (Score 24-30)	74%
Duke Social Support Index	Feel Loved/Cared for by Relatives/Friends	44.8 ± 14.3

Nutritional assessments highlighted important concerns, with 22% of participants reporting unintentional weight loss in the past three months, and 15% experiencing a decrease in appetite. Mobility issues affecting feeding and grocery shopping were present in 11%, and 13% were affected by stress or acute disease that impacted their dietary intake. The average Body Mass Index (BMI) was 22.7 ± 9.2, with 17% of participants identified as being at risk of malnutrition according to the Mini Nutritional Assessment (MNA). The Malnutrition Universal Screening Tool (MUST) indicated moderate malnutrition risk in 14% of participants, while the Subjective Global Assessment (SGA) reported that 22% had lost weight in the past six months. These results suggest that malnutrition and related concerns are prevalent and need to be addressed through targeted nutritional interventions.

Table 7: Nutritional Assessment (MNA, MUST, SGA)

Nutritional Indicator	Measure	Prevalence (%)
Unintentional Weight Loss	Past 3 Months	22%
Decrease in Appetite		15%
Mobility Issues Affecting Feeding		11%
Stress or Acute Disease Affecting Diet		13%
Body Mass Index (BMI)	Mean ± SD	**22.7 ± 9.2**
MNA Score (Mini Nutritional Assessment)	At Risk of Malnutrition (Score 8-11)	17%
MUST (Malnutrition Universal Screening Tool)	Moderate Malnutrition Risk	14%
Subjective Global Assessment (SGA)	Weight Loss in Past 6 Months	22%
	Gastrointestinal Symptoms	10%

Physical examinations showed that the average blood pressure of participants was 125.6/75.4 mmHg, with 26% having hypertension and 14% presenting hypotension. The average heart rate was 70.7 bpm, with 28% experiencing tachycardia and 12% bradycardia. Respiratory rate averaged 16.8 breaths per minute, and 15% had abnormal readings. The average body temperature was within normal limits at 98.6 °F, and oxygen saturation was high at 98.1%. Regarding anthropometric measurements, the average BMI was 22.7, with 24% of participants classified as underweight and 7% as overweight. Sensory impairments were also notable, with 32% having impaired vision and 25% impaired hearing, indicating the need for enhanced medical and sensory care in the elderly population.

Table 8 (a): Physical Examination – Vitals Measurements

Vital Sign	Mean ± SD	Normal (%)	Abnormal (%)
Blood Pressure (Systolic/Diastolic)	125.6 ± 10.7 / 75.4 ± 5.6 mmHg	Normal: 60%	Hypertension: 26%, Hypotension: 14%
Heart Rate	70.7 ± 5.2 bpm	Normal: 60%	Tachycardia: 28%, Bradycardia: 12%
Respiratory Rate	16.8 ± 2.3 breaths/min	Normal: 85%	Abnormal: 15%
Body Temperature	98.6 ± 0.2 °F	Normal: 92%	Low/High: 8%
Oxygen Saturation	98.1 ± 11.4%	Normal: 95%	Low Saturation: 5%

Table 8 (b): Physical Examination –Anthropometric Measurements

Anthropometric Measurement	Measure	Prevalence (%)
Body Mass Index (BMI)	Mean ± SD: 22.7 ± 9.2	Normal: 69%
		Underweight: 24%, Overweight: 7%
Waist Circumference (Mean ± SD)	85.2 ± 12.5 cm	Abnormal: 8%
Sensory Impairments (Vision)	Impaired: 32%	
Sensory Impairments (Hearing)	Impaired: 25%	

Fall risk assessments revealed that 39-42% of participants were at low to moderate risk of falling, while 11% were at high risk. Notably, 52% of participants had experienced a fall in the past year, and 18% of these falls resulted in injuries. Factors contributing to fall risk included medications that affected balance (37%) and medical conditions that increased the likelihood of falls (55%). These findings underscore the need for fall prevention programs and mobility-enhancing interventions to reduce the risk of injury in older adults.

Table 9: Fall Risk and Mobility Challenges

Fall Risk Indicator	Prevalence (%)
Low to Moderate Fall Risk	39-42%
High Fall Risk	11%
Experienced Falls (Past Year)	52%
Falls Resulting in Injuries	18%
Medications Affecting Balance/Fall Risk	37%
Medical Conditions Affecting Fall Risk	55%

Polypharmacy was a significant issue among participants, with 95% maintaining a comprehensive medication list. Prescription drug use was reported by 82%, and 60% used over-the-counter medications. Herbal supplements were used by 16% and vitamin supplements by 14%. While 74% of participants reported adherence to prescribed dosages, 33% missed doses or stopped medications prematurely. Additionally, 38% experienced side effects, and 26% expressed concerns about medication appropriateness. Notably, only 16% had knowledge of potential drug interactions, and 42% had effective communication with healthcare providers regarding medication management. These findings indicate the need for improved medication management and education on polypharmacy risks in older adults.

Table 10: Polypharmacy and Medication Adherence

Medication Management Indicator	Prevalence (%)
Comprehensive Medication List	95%
Prescription Drugs Usage	82%
Over-the-Counter Medications	60%
Herbal Supplements	16%
Vitamin Supplements	14%
Adherence to Prescribed Dosage/Frequency	74%
Experienced Side Effects	38%
Missed Doses/Stopped Medications	33%
Knowledge of Drug Interactions	16%
Effective Communication with Healthcare Providers	42%

DISCUSSION

The present study offers valuable insights into the multifaceted health challenges faced by the elderly population residing in Shimla, a hilly city in Northern India. Utilizing a comprehensive geriatric assessment (CGA), we explored the prevalence of chronic diseases, functional limitations, cognitive decline, psychosocial well-being, nutritional status, fall risks, and polypharmacy concerns among older adults. The findings of this study emphasize the complexity of aging in such a geographically challenging region, highlighting areas that require targeted healthcare interventions. [7-8]

The study revealed a high prevalence of chronic conditions among the elderly, with hypertension (26%), arthritis (38%), diabetes (20%), and heart disease (17%) being the most common. These findings align with national trends in aging populations, where non-communicable diseases increasingly dominate the health profile of older adults. However, the added burden of living in a hilly region like Shimla, where access to healthcare can be limited by geography, exacerbates the challenges of managing these conditions. The substantial number

of participants reporting recent hospitalizations (18%) and surgeries (8%) reflects the significant health burden faced by this population. A concerted effort to provide accessible, continuous care is essential to managing chronic diseases in older adults, particularly in hard-to-reach areas like Shimla. [9-11]

The functional assessment highlighted that the majority of participants were independent in basic Activities of Daily Living (ADLs), with more than 90% able to perform tasks such as bathing, dressing, and mobility without assistance. However, a greater proportion needed help with Instrumental Activities of Daily Living (IADLs), particularly in managing finances (47%) and preparing meals (42%), suggesting that while older adults maintain basic functional independence, they face challenges with more complex tasks that are essential for independent living. These findings are consistent with the expected decline in IADLs among the elderly, which is often associated with cognitive impairment. [12,13]

Cognitive assessment using the MMSE, MoCA, and Clock Drawing Test identified cognitive decline in a small but notable subset of participants, with 9% exhibiting mild to moderate cognitive impairment. Cognitive function is critical to maintaining independence, and early identification of cognitive decline through regular screening could facilitate timely interventions. Given the prevalence of cognitive impairment in this population, integrating cognitive health support into routine geriatric care is vital for maintaining quality of life and delaying functional decline. [14-17]

Psychosocial assessments revealed high levels of depression (31%) and anxiety (28%) among participants, underscoring the mental health challenges faced by the elderly in Shimla. These findings are concerning, as depression and anxiety are often underdiagnosed in older adults, yet they significantly impact quality of life, social engagement, and physical health. The relatively high rates of social isolation, with 25-26% of participants reporting low social engagement, further exacerbate these mental health issues. Social isolation, particularly in geographically isolated and topographically challenging regions like Shimla, can lead to both mental and physical health deterioration. Strengthening community-based mental health programs and enhancing social support systems, including programs that encourage social interaction, can mitigate these risks and improve overall well-being. [18-21]

Nutritional assessments indicated significant issues with malnutrition, with 22% reporting unintentional weight loss and 17% at risk of malnutrition according to the Mini Nutritional Assessment (MNA). This aligns with global trends where malnutrition among older adults remains a critical public health issue, particularly in rural and hilly regions where access to nutritious food and healthcare is often restricted. The findings of mobility issues affecting food access (11%) and psychological stress impacting dietary intake (13%) emphasize the multifactorial nature of malnutrition in older adults. Given the link between poor nutrition and increased morbidity and mortality in the elderly, there is a clear need for nutritional counseling and interventions to address both dietary and mobility-related barriers to proper nutrition. [22-25]

One of the most concerning findings of this study is the high risk of falls, with 39-42% of participants at low to moderate fall risk and 11% at high risk. Falls were common, with 52% reporting at least one fall in the past year, and 18% of these falls resulting in injuries. The rugged, uneven terrain of Shimla likely exacerbates the risk of falls, particularly for older adults with mobility issues or sensory impairments. Given the well-documented consequences of falls in older adults, including fractures, reduced independence, and increased mortality, fall prevention should be a priority. Interventions such as balance training, environmental modifications to reduce hazards, and the use of assistive devices can significantly reduce the risk of falls and improve mobility. [26-29]

Polypharmacy was a prevalent issue, with 95% of participants taking multiple medications, including 82% on prescription drugs and 60% using over-the-counter medications. While polypharmacy is often necessary to manage multiple chronic conditions, it raises concerns about medication adherence, side effects, and potential drug interactions, particularly among older adults with cognitive impairment. The study found that 33% of participants missed doses or stopped medications, while 38% reported experiencing side effects. Furthermore, only 16% were aware of potential drug interactions. These findings highlight the need for comprehensive medication management programs that educate older adults on the importance of adherence, monitor for potential interactions, and ensure that medications are used safely and effectively. [30-32]

IMPLICATIONS FOR POLICY AND PRACTICE

The findings of this study highlight several areas where healthcare services for older adults in Shimla and similar regions need to be strengthened. First, there is a clear need for community-based, geriatric-specific healthcare programs that address the unique challenges faced by the elderly in hilly regions. Such programs should include regular screening for chronic diseases, cognitive assessments, and nutritional evaluations to ensure early identification and intervention. Fall prevention initiatives, including education on home safety and mobility support, are also crucial in this population. Additionally, the mental health needs of older adults must be prioritized, with an emphasis on reducing social isolation and providing access to mental health services.

Second, healthcare infrastructure in Shimla must be improved to support the growing elderly population. Geriatric-friendly environments, including accessible healthcare facilities, social programs, and physical activity initiatives, can enhance the overall well-being of older adults. Moreover, healthcare providers should adopt a multidisciplinary approach, involving geriatricians, social workers, nutritionists, and pharmacists, to provide holistic care that addresses the physical, cognitive, and psychosocial needs of older adults.

This study provides a comprehensive understanding of the health status of older adults in Shimla and underscores the urgent need for targeted healthcare interventions. By addressing the diverse health needs of the elderly through a combination of medical, nutritional, psychosocial, and mobility-enhancing services, we can significantly improve the quality of life for older adults in hilly regions of India. These findings have important implications for public health policy, calling for tailored, region-specific healthcare strategies to support healthy aging.

CONCLUSION

This study provides a comprehensive examination of the health status of older adults in Shimla, highlighting the complex interplay of chronic diseases, cognitive decline, functional limitations, psychosocial challenges, malnutrition, fall risks, and polypharmacy. The findings underscore the urgent need for tailored, community-based healthcare interventions that address the multifaceted needs of the elderly, particularly in geographically challenging regions. With a high prevalence of chronic conditions like hypertension and arthritis, significant levels of depression and anxiety, and

notable risks of malnutrition and falls, it is clear that the elderly population in Shimla requires holistic care that goes beyond standard medical treatment. Integrating geriatric assessments into routine care, improving access to healthcare services, and fostering social support systems will be critical in promoting healthy aging. This study calls for a multidisciplinary approach, including physical, cognitive, and psychosocial interventions, to ensure that older adults can lead healthier, more independent lives. Strengthening healthcare infrastructure and adopting region-specific strategies will be essential in mitigating the health challenges faced by aging populations in hilly regions like Shimla.

REFERENCES

1. World Health Organization. "Ageing and Health." *World Health Organization*, 2023, www.who.int/news-room/fact-sheets/detail/ageing-and-health.
2. National Institutes of Health (NIH). "World's Older Population Grows Dramatically." *NIH News Releases*, 2023, www.nih.gov/news-events/news-releases/worlds-older-population-grows-dramatically.
3. HelpAge International. "Population Ageing: Navigating the Demographic Shift." *HelpAge International*, 2023, www.helpage.org/news/population-ageing-navigating-the-demographic-shift/.
4. World Health Organization. "Ageing." *World Health Organization*, 2023, www.who.int/health-topics/ageing#tab=tab_1.
5. "Comprehensive Geriatric Assessment." *Physio-pedia*, 2023, www.physio-pedia.com/Comprehensive_Geriatric_Assessment.
6. Choi, Jung-Yeon, et al. "Comprehensive geriatric assessment and multidisciplinary team interventions for hospitalized older adults: A scoping review." *Archives of gerontology and geriatrics* 104 (2023): 104831. https://doi.org/10.1016/j.archger.2022.104831

7. Cohen, S.A., and M.L. Greaney. "Aging in Rural Communities." *Current Epidemiology Reports* 10.1 (2023). doi:10.1007/s40471-023-00317-3.

8. Jones, C.H., and M. Dolsten. "Healthcare on the Brink: Navigating the Challenges of an Aging Society in the United States." *NPJ Aging* 10.1 (2024). doi:10.1038/s41514-024-00025-0.

9. Fisher, H.M., and S. McCabe. "Managing Chronic Conditions for Elderly Adults: The VNS CHOICE Model." *Health Care Financing Review* 27.1 (2005).

10. Barajas-Nava, L.A., et al. "Models of Comprehensive Care for Older Persons with Chronic Diseases: A Systematic Review with a Focus on Effectiveness." *BMJ Open* 12.8 (2022). doi:10.1136/bmjopen-2021-059606.

11. National Council on Aging. "The Top 10 Most Common Chronic Conditions in Older Adults." *National Council on Aging*, 2023, www.ncoa.org/article/the-top-10-most-common-chronic-conditions-in-older-adults/.

12. Jekel, K., et al. "Mild Cognitive Impairment and Deficits in Instrumental Activities of Daily Living: A Systematic Review." *Alzheimer's Research & Therapy* 7.1 (2015). doi:10.1186/s13195-015-0105-2.

13. Rajan, K.B., et al. "Disability in Basic and Instrumental Activities of Daily Living Is Associated with Faster Rate of Decline in Cognitive Function of Older Adults." *The Journals of Gerontology: Series A* 68.5 (2013). doi:10.1093/gerona/gls233.

14. Livingston, G., et al. "Dementia Prevention, Intervention, and Care: 2020 Report of the Lancet Commission." *The Lancet* 396.10248 (2020). doi:10.1016/S0140-6736(20)30367-6.

15. Morley, J.E., et al. "Brain Health: The Importance of Recognizing Cognitive Impairment: An IAGG Consensus Conference." *Journal of the American Medical Directors Association* 16.9 (2015). doi:10.1016/j.jamda.2015.07.013.

16. Shin, J., and E. Cho. "Patterns and Risk Factors of Cognitive Decline Among Community-Dwelling Older Adults in South Korea." *Archives of Gerontology and Geriatrics* 104 (2023). doi:10.1016/j.archger.2023.104809.

17. Polis, B., and A.O. Samson. "Enhancing Cognitive Function in Older Adults: Dietary Approaches and Implications." *Frontiers in Nutrition* 11 (2024). doi:10.3389/fnut.2024.1286725.

18. Shankar, R. "Loneliness, Social Isolation, and Its Effects on Physical and Mental Health." *Missouri Medicine* 120.2 (2023).

19. Brandt, L., et al. "The Effects of Social Isolation Stress and Discrimination on Mental Health." *Translational Psychiatry* 12.1 (2022). doi:10.1038/s41398-022-01904-y.

20. Rohde, Nicholas, et al. "Estimating the mental health effects of social isolation." *Applied research in quality of life* 11 (2016): 853-869.

21. Allied Kin. "Social Isolation, Mental Health, and the Role of Community." *Allied Kin*, 2023, www.allkin.org.sg/be-inspired/social-isolation-mental-health-and-the-role-of-community.

22. Kaur, D., et al. "Nutritional Interventions for Elderly and Considerations for the Development of Geriatric Foods." *Current Aging Science*, 12.1 (2019). doi:10.2174/2211350012666190214115855.

23. Fekete, M., et al. "Nutrition Strategies Promoting Healthy Aging: From Improvement of Cardiovascular and Brain Health to Prevention of Age-Associated Diseases." *Nutrients*, 15.1 (2022). doi:10.3390/nu15010047.

24. Amarya, S., et al. "Changes During Aging and Their Association with Malnutrition." *Journal of Clinical Gerontology and Geriatrics*, 6.3 (2015). doi:10.1016/j.jcgg.2015.06.002.

25. Kassis, A., et al. "Nutritional and Lifestyle Management of the Aging Journey: A Narrative Review." *Frontiers in Nutrition*, 9 (2023). doi:10.3389/fnut.2023.1087505.

26. Clemson, Lindy, et al. "Environmental interventions for preventing falls in older people living in the community." *Cochrane Database of systematic reviews* 3 (2023). **https://doi.org/10.1002/14651858.CD013258.pub2**

27. Montero-Odasso, M., et al. "World Guidelines for Falls Prevention and Management for Older Adults: A Global Initiative." *Age and Ageing* 51.9 (2022). doi:10.1093/ageing/afac205.

28. Guirguis-Blake, J.M., et al. "Interventions to Prevent Falls in Older Adults: Updated Evidence Report and Systematic Review for the US Preventive Services Task Force." *JAMA* 332.1 (2024). doi:10.1001/jama.2024.3261.

29. Giovannini, S., et al. "Falls Among Older Adults: Screening, Identification, Rehabilitation, and Management." *Applied Sciences* 12.15 (2022). doi:10.3390/app12157934.

30. Jimmy, B., and J. Jose. "Patient Medication Adherence: Measures in Daily Practice." *Oman Medical Journal* 26.3 (2011). doi:10.5001/omj.2011.39.

31. Cross, Amanda J., et al. "Interventions for improving medication-taking ability and adherence in older adults prescribed multiple medications." *Cochrane Database of Systematic Reviews* 5 (2020). **https://doi.org/10.1002/14651858.CD012419.pub2**

32. Xu, Mengqi, et al. "Educational programmes for improving medication adherence among older adults with coronary artery disease: A systematic review and meta-analysis." *International Journal of Nursing Studies* (2024): 104924. https://doi.org/10.1016/j.ijnurstu.2024.104924