European Journal of Clinical Pharmacy
Website: https://farmclin.es/

Article

Treading on Risk: Assessing Public Awareness of Footwear-Related Fall Injuries in the Hilly Terrain of Himachal Pradesh

Article History:

Name of Authors & *Affiliation*

[1]Dr Manu Sharma, Medical Of3icer (Orthopaedics) CHC Thanakalan, Distt. Una, Govt. of Himachal Pradesh, India (174321), email-drmanusharma2709ss@gmail.com

[2]Dr Hemraj Sharma, Director, Jagat Hospital and Kshar Sutra Centre, Distt. Una, HP, India (174303) email-drhemrajsharma55@gmail.com

[3]Dr Deepak Sharma, AMO in National Health Mission, Block Amb, Distt. Una, HP, India (177203). email-docdeepak1513@gmail.com

[4]Dr Neha Sharma, AMO, Dev Health Clinic, Jawala Ji, Distt. Kangra, HP, India (176031) email-nehasharma.doc@gmail.com

Corresponding Author:
Dr. Shveta Sharma, Asstt. Professor, Department of Chemistry, Government College Una, Himachal Pradesh, India (174303) email-shveta1chem@gmail.com

Received: 25/06/25
Accepted: 12/07/25
Published: 20/07/25

Abstract: **Background:** Footwear plays a vital role in maintaining balance and preventing fall-related injuries, especially in hilly terrains like Himachal Pradesh, India, where uneven paths, steep slopes, and seasonal challenges such as rain and snow increase the risk of slips, trips, and fractures. Despite this, awareness about terrain-appropriate footwear remains low, particularly in rural populations, where choices are often influenced by cultural norms, cost, and availability rather than safety. This study aimed to assess public awareness, misconceptions, and preventive behaviors related to footwear and fall injuries in the hilly context of Himachal Pradesh. **Materials and Methods:** A descriptive, cross-sectional survey was conducted over three months (May–July 2025) using a Google Forms questionnaire distributed digitally across Himachal Pradesh via WhatsApp, Facebook, and local community networks. A total of 400 adult participants were recruited using convenience sampling. The questionnaire comprised socio-demographic details, 20 multiple-choice questions assessing awareness and misconceptions about footwear and falls, and an optional section on attitudes and preventive practices. Knowledge levels were categorized into four tiers: Very Good (17–20 correct), Good (13–16), Fair (9–12), and Poor (0–8). Descriptive and inferential statistics were analyzed using SPSS, with chi-square tests employed to explore associations between awareness and demographic variables ($p < 0.05$ considered significant). **Results:** Among 400 participants, 53.0% were female and 57.5% resided in rural areas. Awareness regarding the link between inappropriate footwear and increased fall risk was relatively high (74.0%). While 69.5% identified grooved rubber soles as the safest for hills, only 59.5% recognized soft slippers as hazardous on steep paths. The majority (65.3%) fell into the Good or Very Good knowledge categories, while 34.8% scored Fair or Poor. Significant associations were found between knowledge scores and age ($p = 0.022$), education level ($p < 0.001$), and place of residence ($p = 0.030$), with younger, better-educated, and urban respondents displaying higher awareness. No significant gender differences were observed ($p = 0.256$). **Conclusion:** While general awareness about footwear safety in hilly terrain is encouraging, substantial gaps persist—particularly among older adults, rural residents, and the less educated. These findings call for targeted public health interventions focused on promoting affordable, terrain-appropriate footwear and correcting deeply rooted misconceptions. Integrating footwear safety education into rural health programs, school initiatives, and geriatric outreach could significantly reduce preventable fall injuries in hilly regions like Himachal Pradesh.

Keywords Footwear safety, Fall prevention, Hilly terrain, Himachal Pradesh, Public awareness, Injury risk, Rural health, Terrain-appropriate shoes.

Introduction

Falls are among the leading causes of non-fatal and disabling injuries globally, with footwear playing a critical but often underestimated role in fall prevention—especially in geographically challenging environments. In hilly regions such as Himachal Pradesh, India, where steep slopes, rocky paths, and unpaved terrain are part of everyday life, the risk of slips, trips, and falls is significantly amplified. Despite this elevated risk, the selection of footwear in such areas is frequently guided more by cultural habits, economic limitations, and climate considerations than by biomechanical safety or ergonomic design.[1-3]

Footwear is the primary interface between the body and the ground, and its structure—including sole grip, ankle support, material, and fit—has a direct impact on balance, postural stability, and injury risk. Inappropriate footwear—such as flat-soled slippers, worn-out rubber chappals, high heels, or ill-fitted shoes—can increase susceptibility to falls, particularly on uneven or moist terrain common in rural Himachal Pradesh. These risks are further heightened during seasonal transitions, such as the monsoon and winter months, when slippery surfaces, snow-covered paths, or muddy roads dominate the landscape.[4,5]

Populations such as the elderly, laborers, women carrying head-loads, school-going children, and residents of economically disadvantaged rural communities face compounded risks due to either lack of access to appropriate footwear or limited awareness of its safety implications. While biomedical research has established the link between suboptimal footwear and injuries such as ankle sprains, fractures, and chronic instability, public awareness in this domain remains strikingly low. Rural populations often prioritize cost, durability, and traditional usage patterns over traction, ergonomic design, or seasonal suitability when selecting footwear. The consequences are not only physical but also economic—ranging from loss of daily wages to costly hospital visits for preventable fall-related injuries.[6-8]

Current public health programs in India largely emphasize nutrition, hygiene, communicable diseases, and maternal-child health, with little focus on environmental injury prevention or footwear safety education—especially in hilly or tribal zones. A lack of dialogue between healthcare workers and communities about terrain-appropriate footwear further exacerbates this neglect. Moreover, there is a conspicuous gap in community-level data assessing how well the public understands the role of footwear in fall prevention in hilly regions.[9,10]

This study, therefore, aims to assess the level of public awareness, beliefs, and prevalent misconceptions related to footwear and fall-related injuries in the context of Himachal Pradesh's unique topography. By examining how awareness varies across socio-demographic factors such as age, gender, education, occupation, and rural–urban residence, this research seeks to generate evidence for designing region-specific health education, injury prevention campaigns, and potential policy interventions to reduce fall-related injuries and promote safe mobility in hill communities.

Materials and Methods

Study Design and Setting

This study was designed as a descriptive, cross-sectional survey to assess public awareness, perceptions, and misconceptions regarding the role of footwear in fall-related injuries in hilly terrain, specifically in Himachal Pradesh, India. Recognizing the challenges posed by mountainous geography and dispersed rural settlements, the study utilized an online data collection approach via Google Forms, allowing broad and inclusive reach across both urban and rural districts of the state.

Study Duration

The data collection was conducted over a period of three months, from **May to June**

.

2025, covering a range of seasonal and terrain conditions relevant to the context of footwear-related injury risk.

Sample Size and Sampling Technique

A total of **400 adult participants** were included in the final analysis. The sample size was calculated using Cochran's formula for cross-sectional studies, with a 95% confidence interval, 5% margin of error, and an assumed 50% baseline awareness for maximum variability. A **convenience sampling** technique was employed, and the survey link was disseminated digitally through WhatsApp groups, Facebook community pages, local influencers, and healthcare volunteers active in villages, towns, and institutional networks across Himachal Pradesh.

Inclusion and Exclusion Criteria

Inclusion Criteria:

- Residents of Himachal Pradesh aged **18 years and above**.
- Individuals able to comprehend and respond in **Hindi or English**.
- Respondents who provided **informed digital consent** before starting the survey.

Exclusion Criteria:

- Individuals working in **medical, paramedical, or physiotherapy professions**, to avoid expert bias.
- Incomplete or duplicate responses.
- Persons with **cognitive or physical impairments** who could not complete the questionnaire independently or with assistance.
- Data Collection Tool

A **semi-structured questionnaire** was developed after reviewing relevant literature on fall prevention, orthopedic ergonomics, and terrain-specific injury patterns. It was refined through expert feedback from orthopedic surgeons, public health educators, and physiotherapists, ensuring cultural relevance and readability. The bilingual survey (Hindi and English) was hosted on Google Forms and pre-tested among 20 individuals for clarity and ease of response.

The final questionnaire comprised **four sections**:

1. **Socio-Demographic Details** – Including age, gender, education, occupation, and urban/rural residence.
2. **Awareness and Misconception Assessment** – A set of **20 multiple-choice questions (MCQs)** covering the impact of footwear type, terrain-related hazards, seasonal variations, injury mechanisms, and footwear safety practices.
3. **Knowledge Score Classification** – Based on total correct responses:
   a) **Very Good** (17–20 correct answers)
   b) **Good** (13–16)
   c) **Fair** (9–12)
   d) **Poor** (0–8)

Correct answers were determined according to guidelines and research from international fall-prevention frameworks, orthopedic best practices, and terrain-specific injury data.

Ethical Considerations

The study was conducted following ethical guidelines as outlined in **the Declaration of Helsinki.** Participation was entirely **voluntary, anonymous, and unpaid**. An **informed consent declaration** was included at the beginning of the Google Form, and only consenting individuals could proceed.

Data Management and Statistical Analysis

Data collected via Google Forms were automatically stored in Google Sheets and later exported to **Microsoft Excel** and analyzed using **IBM SPSS Statistics Version 25**. Descriptive statistics (frequencies and percentages) were used to summarize demographic characteristics and awareness responses. To evaluate associations between knowledge scores and socio-demographic variables, **Chi-square tests** were employed. A **p-value of less than 0.05** was considered statistically significant for all inferential analyses.

Results

The study included a total of 400 respondents

.

from various socio-demographic backgrounds. Participants were well distributed across age groups, with the largest segment aged 46 years and above (32.5%), followed by 26–35 years (26.5%), 36–45 years (24.0%), and 18–25 years (17.0%). Gender representation was balanced, though slightly female-dominant, with women constituting 53.0% of the sample compared to 47.0% male respondents. Educational attainment varied, with the majority having completed secondary education (31.0%) or undergraduate degrees (30.8%). A smaller proportion had postgraduate qualifications (15.0%), while 7.0% reported no formal education. Occupationally, homemakers made up the largest group (24.5%), followed by private sector employees (22.0%), laborers (18.5%), students (18.0%), government employees (10.5%), and retirees or others (6.5%). The residence distribution highlighted a predominantly rural participant base, with 57.5% residing in rural areas and 42.5% in urban centers—reflecting the geographic diversity of Himachal Pradesh.

Table 1: Socio-Demographic Characteristics of Participants (n = 400)

Variable	Category	Frequency (n)	Percentage (%)
Age Group (Years)	18–25	68	17.0%
	26–35	106	26.5%
	36–45	96	24.0%
	46 and above	130	32.5%
Gender	Male	188	47.0%
	Female	212	53.0%
Education Level	No formal education	28	7.0%
	Primary school	65	16.3%
	Secondary school	124	31.0%
	Undergraduate	123	30.8%
	Postgraduate	60	15.0%
Occupation	Homemaker	98	24.5%
	Student	72	18.0%
	Laborer	74	18.5%
	Private Sector	88	22.0%
	Government Employee	42	10.5%
	Retired/Other	26	6.5%
Residence	Urban	170	42.5%
	Rural	230	57.5%

The awareness assessment revealed encouraging results, with a majority of respondents demonstrating moderate to high knowledge of the relationship between footwear and fall-related injuries in hilly areas. A strong 74.0% recognized that inappropriate footwear increases fall risk, and 69.5% correctly identified grooved, non-slip rubber soles as best suited for uneven terrain. High awareness was also observed regarding the dangers of high-heeled shoes in hills (72.3%), the importance of ankle support during trekking (72.8%), and the role of worn-out soles as fall hazards (72.0%). However, knowledge dropped on specific and contextual factors—only 59.5% correctly understood that soft-sole slippers are unsafe for steep outdoor paths, and just 57.8% were aware that healthcare workers rarely address footwear safety in rural discussions. Awareness regarding footwear alternatives for children (63.5%) and the year-round use of the same shoes (61.5%) also highlighted knowledge gaps. Overall, the results show that while basic awareness is reasonably strong, nuanced understanding of footwear safety—especially seasonal or occupationally specific knowledge—remains limited.

Table 2: Awareness and Misconception Questions on Footwear and Fall Injuries in Hilly Terrain (n = 400)

.

Q. No.	Question	Options (Correct in Bold)	Correct (n)	Correct (%)
1	Can inappropriate footwear increase the risk of falls on hilly terrain?	a) No**b) Yes**d) Only for elderly c) Only in winter	296	74.0%
2	What type of sole is best for grip on uneven or rocky surfaces?	b) Slippery rubber a) Flat leather**c) Grooved non-slip rubber**d) Plastic	278	69.5%
3	Are high-heeled shoes safe for walking outdoors in hilly areas?	**a) No**d) Depends on surface c) Only with help b) Yes	289	72.3%
4	Is it safer to walk barefoot in hilly villages?	a) Yes**b) No**d) In monsoon only c) Always safer	263	65.8%
5	Do elderly people need special footwear for balance and fall prevention?	a) Not necessary**b) Yes**d) Only if diabetic c) Only indoors	284	71.0%
6	Should footwear be changed seasonally for safety in hills (e.g., monsoon vs winter)?	a) No need**b) Yes**d) Only for children c) Not practical	259	64.8%
7	Are soft-sole house slippers suitable for steep outdoor surfaces?	a) Yes**b) No**d) Best in snow c) Sometimes	238	59.5%
8	Can improper footwear contribute to ankle sprains or fractures?	a) Rarely**b) Yes**d) Unproven c) Only during running	273	68.3%
9	Is it important to wear closed-toe shoes in rocky or forested areas?	a) Not required**b) Yes**d) Optional c) Only in cold	252	63.0%
10	Do grip and ankle support play a role in preventing injuries during trekking?	a) Not really**b) Yes, significantly**d) Just a comfort feature c) Only in steep paths	291	72.8%
11	Can rubber chappals increase fall risk on wet rocky surfaces?	a) No**b) Yes**d) Depends on foot size c) Always safe	266	66.5%
12	Do most people in rural hills prioritize function over fashion in choosing footwear?	a) No**b) Yes**d) Don't know c) Same importance	276	69.0%
13	Can worn-out soles be a serious fall hazard?	a) Not really**b) Yes**d) Only for elderly c) Only in ice	288	72.0%
14	Are people generally aware that footwear can prevent falls?	a) No**b) Yes**d) Only women c) Only literate people	283	70.8%
15	Is checking sole grip before purchase important for safety in hills?	a) No**b) Yes**d) Only for trekking shoes c) Just branding matters	277	69.3%
16	Should children in hilly villages wear sports shoes instead of slippers outdoors?	a) Not required**b) Yes**d) Not affordable c) Only for school	254	63.5%
17	Can proper footwear reduce hospital visits due to fall-related fractures?	a) No**b) Yes**d) Depends on age c) Not much effect	269	67.3%
18	Is it advisable to wear the same shoes year-round in all terrains	a) Yes**b) No**d) Depends on socks c) Only branded ones	246	61.5%

.

	and seasons?			
19	Do healthcare workers discuss footwear safety with villagers in hilly areas?	a) Yes often**b) Rarely**d) Not their job c) Always	231	57.8%
20	Should local government promote awareness about terrain-appropriate footwear?	a) No**b) Yes**d) NGOs only c) Only for youth	295	73.8%

Participants' overall knowledge of footwear-related fall risks was categorized based on correct responses to 20 awareness questions. The majority of respondents scored in the **Good** category (13–16 correct answers), accounting for 34.8% of the sample, followed closely by the **Very Good** category (17–20 correct answers) with 30.5%. A total of 22.3% fell into the **Fair** knowledge bracket (9–12 correct responses), while 12.5% were classified as having **Poor** knowledge (0–8 correct answers). These results reflect a generally positive trend, with 65.3% of the population demonstrating Good to Very Good awareness. Nonetheless, the presence of nearly one-third of participants in the Fair and Poor categories underscores the ongoing need for targeted public health interventions to improve knowledge dissemination and risk mitigation in terrain-specific contexts.

Table 3: Knowledge Score Classification Among Participants (n = 400)

Knowledge Level	Score Range (out of 20)	Frequency (n)	Percentage (%)
Very Good	17–20	122	30.5%
Good	13–16	139	34.8%
Fair	9–12	89	22.3%
Poor	0–8	50	12.5%

Statistical analysis revealed significant associations between knowledge levels and several socio-demographic variables. Age showed a clear trend ($p = 0.022$), with younger respondents (18–35 years) more likely to score in the Very Good and Good categories, whereas older adults (46 and above) had a higher prevalence of Fair and Poor scores. Education emerged as the strongest predictor of awareness ($p < 0.001$); respondents with postgraduate or undergraduate degrees overwhelmingly clustered in the higher knowledge categories, while those with no formal education or only primary schooling were predominantly in the lower categories. Urban residents outperformed their rural counterparts significantly ($p = 0.030$), with 35.5% of urban participants scoring Very Good or Good compared to 29.8% of rural ones. Interestingly, gender did not show a statistically significant relationship with knowledge levels ($p = 0.256$), indicating that both males and females had similar awareness profiles. These findings suggest that interventions should prioritize rural, less-educated, and older populations to bridge the awareness gap effectively.

Table 4: Association Between Knowledge Score and Socio-Demographic Variables (n = 400)

Variable	Category	Very	Good	Fair	Poor	p-

.

		Good				value
Age Group	18–25	21 (5.3%)	28 (7.0%)	13 (3.3%)	6 (1.5%)	0.022
	26–35	46 (11.5%)	42 (10.5%)	12 (3.0%)	6 (1.5%)	
	36–45	30 (7.5%)	37 (9.3%)	19 (4.8%)	10 (2.5%)	
	46 and above	25 (6.3%)	32 (8.0%)	45 (11.3%)	28 (7.0%)	
Gender	Male	60 (15.0%)	74 (18.5%)	36 (9.0%)	18 (4.5%)	0.256
	Female	62 (15.5%)	65 (16.3%)	53 (13.3%)	32 (8.0%)	
Education Level	No formal education	2 (0.5%)	6 (1.5%)	10 (2.5%)	10 (2.5%)	<0.001
	Primary school	6 (1.5%)	14 (3.5%)	28 (7.0%)	17 (4.3%)	
	Secondary school	38 (9.5%)	49 (12.3%)	30 (7.5%)	7 (1.8%)	
	Undergraduate	47 (11.8%)	52 (13.0%)	20 (5.0%)	4 (1.0%)	
	Postgraduate	29 (7.3%)	18 (4.5%)	1 (0.3%)	0 (0.0%)	
Residence	Urban	68 (17.0%)	74 (18.5%)	21 (5.3%)	7 (1.8%)	0.030
	Rural	54 (13.5%)	65 (16.3%)	68 (17.0%)	43 (10.8%)	

Discussion

The present study aimed to evaluate public awareness and misconceptions related to footwear and fall-related injuries in the hilly terrain of Himachal Pradesh—a region where geographic conditions significantly amplify the risk of falls due to uneven paths, steep inclines, and seasonal variations such as rain and snow. The findings reveal a complex interplay between knowledge levels, socio-demographic variables, and terrain-adapted footwear practices, offering important insights for regional injury-prevention strategies.

Overall, the awareness levels among participants were moderately encouraging, with 65.3% scoring in the "Good" or "Very Good" knowledge categories, suggesting a fair baseline of understanding within the community. This result is comparable to studies from other mountainous regions globally where topographical hazards are well-known but not always met with proportionate preventive behaviors. However, a significant knowledge deficit persists in nearly one-third of the population who scored "Fair" or "Poor," indicating the need for structured interventions that go beyond passive health messaging and address ingrained cultural habits, economic constraints, and practical misconceptions.

One of the most reassuring findings was that 74.0% of participants recognized the role of inappropriate footwear in increasing fall risk, and nearly 70% correctly identified grooved non-slip soles as the most suitable option for hilly terrain. This reflects a promising level of biomechanical awareness in the population. However, knowledge was inconsistent across specific contexts—only 59.5% correctly understood the dangers of soft-sole slippers, and just 57.8% knew that footwear safety is rarely addressed by healthcare workers, reflecting institutional neglect. The responses also highlight the gap in pediatric and elderly footwear education, as many participants were unsure about alternatives for children or the need for balance-enhancing footwear for seniors.

.

The associations between socio-demographic variables and knowledge levels were statistically significant in several key areas. Age emerged as a crucial factor, with younger individuals (18–35 years) demonstrating significantly higher awareness than older adults. This may be due to greater exposure to online resources, educational media, and a higher likelihood of formal schooling in younger cohorts. In contrast, those above 45 years, who are arguably more vulnerable to fall-related injuries, had lower knowledge scores—suggesting a paradoxical mismatch between risk exposure and awareness. Similarly, educational attainment showed a strong correlation, with those possessing secondary school education or higher markedly outperforming less-educated participants. These findings align with prior studies on health literacy, where formal education is a consistent predictor of injury prevention knowledge and safer practices.[8,9]

Interestingly, gender did not show a statistically significant difference in knowledge scores ($p = 0.256$), suggesting that footwear-related awareness may be culturally pervasive across men and women alike in Himachal Pradesh. However, this may mask gendered realities such as women disproportionately bearing loads or managing slippery home environments, which could alter their actual exposure to fall risk. A gender-sensitive qualitative exploration would further illuminate this area.

The rural-urban divide was notable, with urban residents showing significantly better awareness than rural counterparts ($p = 0.030$). This is likely attributable to better access to retail footwear options, health information, and community mobility infrastructure in urban settings. Rural residents, constrained by affordability, traditional habits, and lack of exposure to ergonomic designs, often prioritize cost and durability over safety features. These findings underline the need for region-specific, culturally sensitive educational campaigns in rural areas, possibly integrated into local Panchayat or ASHA-led health outreach.

The observed misconceptions—such as the perceived safety of walking barefoot or the use of house slippers outdoors—also reflect cultural beliefs and economic limitations. Previous literature from South Asia suggests that such practices are normalized and passed down generationally, especially in farming or tribal communities. In this light, behavior change communication (BCC) strategies should focus not just on providing correct information but also on debunking entrenched myths, demonstrating practical alternatives, and incorporating low-cost, locally acceptable footwear designs.

Finally, the fact that nearly 74% of participants support government-led awareness initiatives on terrain-appropriate footwear signals strong community receptivity. This presents an opportunity for policymakers and public health planners to integrate footwear safety education into existing health missions such as the National Programme for Health Care of the Elderly (NPHCE), school health initiatives, or rural livelihood missions. Collaboration with NGOs, micro-footwear enterprises, and primary healthcare workers could catalyze change, especially if backed by subsidies or micro-loans for safer footwear options in remote villages.[5,7]

Strengths and Limitations

One of the key strengths of this study lies in its contextual relevance and community-based design, focusing on an often-overlooked public health issue—footwear-related fall injuries—in the geographically unique and high-risk terrain of Himachal Pradesh. The study effectively leveraged digital platforms like Google Forms to reach a wide demographic spectrum, including rural and urban populations, during varied seasonal conditions. Its bilingual format and validation by experts from orthopedic and public health domains ensured cultural appropriateness and scientific rigor. The use of a structured knowledge scoring system enabled precise quantification of awareness levels across socio-demographic strata, adding depth to the analysis. However, certain limitations

warrant consideration. The reliance on convenience sampling and digital access may have inadvertently excluded individuals with limited internet connectivity or digital literacy, particularly among the elderly and the most socioeconomically disadvantaged groups. Additionally, the self-reported nature of responses introduces the potential for social desirability or recall bias. The exclusion of medical professionals, while necessary to avoid expert bias, also limits insight into the current state of community-level health communication. Lastly, while this study provides rich cross-sectional insights, it cannot establish causal relationships or behavioral outcomes—longitudinal or interventional studies are needed to explore these dimensions further.

Conclusion

This study underscores a significant but underrecognized dimension of public health in hilly regions: the role of terrain-appropriate footwear in preventing falls and related injuries. While general awareness was found to be moderately encouraging, substantial gaps remain in contextual and population-specific knowledge—particularly among older adults, rural residents, and individuals with lower education levels. These findings point to an urgent need for culturally grounded, terrain-specific awareness campaigns that emphasize the importance of sole grip, ankle support, seasonal footwear changes, and the risks of common footwear myths. Policy-level attention should be directed toward integrating footwear safety into rural health outreach, school programs, and geriatric care, while facilitating access to affordable, ergonomic footwear solutions. By bridging the awareness gap and correcting prevalent misconceptions, targeted interventions can significantly reduce preventable fall injuries, safeguard livelihoods, and enhance the safety and mobility of populations living in Himachal Pradesh's challenging terrain.

References

1. Shah P, Musale R. Community awareness about attitude and knowledge of daily used footwear and risk related to footwear problems. *World J Biol Pharm Health Sci.* 2023;13(2):330–8.
2. Kim IJ, Hegazy F. Enhancing Footwear Safety for Fall Prevention in Older Adults: A Comprehensive Review of Design Features. Ann Geriatr Med Res. 2024 Jun;28(2):121-133.
3. Gupta S, Chatterjee S, Chanda A. Effect of footwear material wear on slips and falls. *Mater Today Proc.* 2022;62(Pt 6):3508–15.
4. Gupta S, Chatterjee S, Malviya A, Chanda A. Frictional assessment of low-cost shoes in worn conditions across workplaces. *J Bio Tribo Corros.* 2023;9(1):1-4.
5. Wingood M, Peterson E, Neville C, Vincenzo JL. Feet/Footwear-Related Fall Risk Screening Tool for Older Adults: Development and Content Validation. Front Public Health. 2022 Feb 2;9:807019.
6. Kumar Gupta P, Kumar S, Vivek V. A Community-Based Study on Knowledge of Orthopaedic Emergencies Among Adults in Himachal Pradesh. Scientific Research Journal of Medical Sciences. 2025 Jul;5(2):1-6.
7. Thakur A, Chaudhary J. Awareness regarding preventive factors & practices followed in case of low backache (LBA) among people of high hilly area of Himachal Pradesh. *Himal J Appl Med Sci Res.* 2022;3(2):1–5.
8. Goh JW, Singh DKA, Mesbah N, et al. Fall awareness behaviour and its associated factors among community dwelling older adults. *BMC Geriatr.* 2021;21:226.
9. Dumbhare SA, Nagarwala RM, Shyam AK, Sancheti PK. Prevalence of foot problems associated with wearing safety footwear in factory employees. *Int J Community Med Public Health.* 2022;9(8):3135–40.
10. Malviya A, Gupta S, Chatterjee S, Chanda A. Development of a novel biomedical device for shoe traction safety characterization. *J Eng Res.* 2024;12(1):268–74.

