International Comparative Study of Fall Prevention Interventions for Community-Dwelling Older Adults from a Policy Tool Perspective: Postprint

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Date: 2023-06-02T15:41:28+00:00

Abstract

Background: Falls among older adults impose a heavy burden on society and families; formulating effective community-based fall intervention policies constitutes an important measure for addressing this global public health issue.

Objective: To analyze and compare the content composition, key measures, and implementation strategies of current community-based fall intervention policies for older adults across different countries from a policy instruments perspective.

Methods: Based on population aging degree and economic income levels, six countries from Asia, North America, and Europe (Japan, Singapore, Thailand, United States, Germany, Russia) were selected as sample countries. Official websites of relevant government departments and their affiliated agencies (including national ministries of health and centers for disease control and prevention) and non-governmental organizations (including the European Fall Prevention Network, American Council on Aging, Japan Fall Prevention Association, and German Health Insurance Association) were reviewed. Using keywords "older adults, falls/falling/accidental injuries, prevention," national community-based fall intervention policy texts for older adults published between January 2010 and June 2022 were retrieved and analyzed textually across dimensions of policy instruments (demand-side, supply-side, environmental) and injury prevention strategies (education-prevention strategies, evaluation strategies, etc.).

Results: Among 24 policy documents, the policy instrument dimension contained 212 coded reference points, with environmental, supply-side, and demand-side policy instruments accounting for 45.3% (96/212), 40.6% (86/212), and 14.1% (30/212), respectively. Among high-income countries, the United States and Germany most frequently utilized the public service tool under supply-side

policy instruments, with proportions of 40.5% (17/42) and 13.8% (8/58), respectively; Singapore focused on utilizing the infrastructure construction tool under supply-side policy instruments [24.1% (7/29)]. Among non-high-income countries, Russia and Thailand most frequently applied environmental policy instruments, with utilization rates of 51.3% (20/39) and 55.6% (10/18), respectively. Among supply-side policy instruments, public services were most commonly used, accounting for 17.5% (37/212); among environmental policy instruments, technical standards were most common, accounting for 10.8% (23/212); among demand-side policy instruments, medical insurance payment was most common, accounting for 4.7% (10/212). Additionally, the injury prevention strategy dimension contained 105 reference points, with education-prevention strategies comprising the highest proportion at 31.4% (33/105), and engineering strategies the lowest at 5.7% (6/105). High-income countries have entered a multi-sectoral collaborative policy implementation stage, while non-upper-middle-income countries remain in the policy formulation stage by ministries of health.

Conclusion: The six countries emphasized application of public services and infrastructure construction under supply-side policy instruments; demand-side instrument applications can be summarized as medical insurance-managed intervention services, fiscal fund-raised intervention projects, and price subsidies to attract service purchases; environmental instruments focused on planning, organization, publicity, and standard formulation. By integrating intervention priorities and specific measures from the six countries and drawing upon advanced experiences in improving public services, strengthening evidence-based practice, standardizing technical standards, fiscal incentives, medical insurance management, and price subsidies, community-based fall intervention policies for older adults in China can be further optimized.

Full Text

Falls Prevention Intervention for Community-dwelling Older Adults from the Perspective of Policy Tools: An International Comparative Study

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Abstract

Background: Falls among older adults impose a heavy burden on society and families. Developing effective community-based fall prevention intervention policies is an important initiative to address this global public health problem.

Objective: To analyze and compare the content composition, key initiatives, and implementation strategies of current community-based fall prevention intervention policies for older adults in different countries from the perspective of policy tools.

Methods: Based on the degree of population aging and economic income level, six countries in Asia, North America, and Europe (Japan, Singapore, Thailand, United States, Germany, Russia) were selected as sample countries. The official websites of relevant government departments such as national ministries of health and centers for disease control and prevention, as well as non-governmental organizations including the Prevention of Falls Network Europe, National Council on Aging (U.S.), Association of Fall Prevention (Japan), and National Association of Statutory Health Insurance Funds (Germany) were searched. Using keywords such as "older adults," "falls/drops/accidental injuries," and "prevention," national policy documents on community-based fall prevention interventions for older adults published between January 2010 and June 2022 were retrieved. Textual analysis was conducted from the dimensions of policy tools (demand-side, supply-side, and environmental-side) and injury prevention strategies (education and prevention strategies, evaluation strategies, etc.).

Results: Among the 24 policy documents, there were 212 coded reference points in the policy tool dimension. Environmental-side, supply-side, and demand-side policy tools accounted for 45.3% (96/212), 40.6% (86/212), and 14.1% (30/212), respectively. Among high-income countries, the United States and Germany most frequently applied public service tools under supply-side policy tools, accounting for 40.5% (17/42) and 13.8% (8/58), respectively. Singapore focused on infrastructure construction tools under supply-side policy tools [24.1% (7/29)]. Among non-high-income countries, Russia and Thailand most frequently applied environmental-side policy tools, accounting for 51.3% (20/39) and 55.6% (10/18), respectively. Among supply-side policy tools, public service was most frequently used, accounting for 17.5% (37/212). Among environmental-side policy tools, technical standards were most frequently used, accounting for 10.8% (23/212). Among demand-side policy tools, medical insurance payment was most frequently used, accounting for 4.7% (10/212). Additionally, there were 105 reference points in the injury prevention strategy dimension. Education and prevention strategies accounted for the highest proportion at 31.4% (33/105), while engineering strategies accounted for the lowest at 5.7% (6/105). High-income countries have entered the multi-sectoral collaborative policy implementation stage, while non-high-income countries remain in the policy formulation stage led by ministries of health.

Conclusion: The six countries focus on public services and infrastructure construction under supply-side policy tools. The application of demand-side tools can be summarized as: medical insurance-managed intervention services, financial fund-established intervention projects, and price subsidies to attract service purchases. Environmental tools emphasize planning, organization, advocacy, and standard setting. By combining the priorities and specific measures of intervention work in the six countries, China should fully draw on advanced experiences in improving public services, strengthening evidence-based practices, standardizing technical standards, providing financial incentives, expanding medical insurance management, and offering price subsidies to further optimize its community-based fall prevention intervention policies for older adults.

Keywords: Older adults; Falls prevention; Community setting; Policy tools; Content analysis method

Chinese Classification Codes: R 339.34; R 12

Document Code: A

DOI: 10.12114/j.issn.1007-9572.2023.0092

Citation: GU H X, LIU Y, LIU Y L. Falls prevention intervention for community-dwelling older adults from the perspective of policy tools: an international comparative study[J]. Chinese General Practice, 2023. [Epub ahead of print]

Digital Publication Date: 2023-05-24

Introduction

A fall is defined as a sudden, involuntary, and unintentional change in body position that results in coming to rest on the ground or a lower level. Approximately one-third of older adults aged 65 and above worldwide experience a fall each year [1]. In China, the annual fall rate among older adults aged 60 and above ranges from 14.7% to 34% [2]. Falls can cause pain, loss of self-care ability, disability, and even premature death among older adults. In China, falls are the leading cause of injury-related death among people aged 65 and above [3], and mortality due to falls among older adults has shown an upward trend in most provinces nationwide between 2013 and 2020 [4]. As population aging deepens, the global disease burden caused by falls continues to grow [5], with projected costs for treatment and care of falls among community-dwelling older adults expected to exceed 1.5 billion USD by 2050 [6], imposing a heavy burden on families and society. In response, the WHO advocates for prioritizing fall prevention among older adults as a public health imperative in national policy planning [1,7-8]. Fall intervention policies provide critical information, systematic approaches, and software/hardware support for successfully implementing

community-based fall prevention for older adults, making policy research essential for developing and optimizing these interventions [9]. Existing research on community-based fall intervention policies has focused on policy document quality assessment [10]; however, there is a lack of standardized policy analysis tools [11] and comparative studies examining different countries' policy development stages and content similarities and differences. Based on a policy tools perspective, this study selected 24 national-level policy documents on community-based fall interventions for older adults from six countries, employing content analysis combined with quantitative analysis to summarize policy content composition, explore priorities and development models of fall intervention work, and provide reference for developing and optimizing aging services policies.

1.1.1 Typical Country Sampling

To understand how the degree of aging and economic level influence policy formulation, this study referenced United Nations classification standards and divided countries into mild aging (population aged 60+ accounting for 10%-20% of total population) and moderate to severe aging (population aged 60+ exceeding 20% of total population) based on 2022 population statistics [12]. Combined with the World Bank' s 2021 classification of economy income levels [13], a two-dimensional sampling matrix of aging degree and income level was constructed to select six eligible countries as research samples (Table 1).

Table 1 Country Sampling Matrix

Economy Classification	Moderate to High Aging	Mild Aging
High-income economies	Japan, Germany	United States, Singapore
Non-high-income economies	Russia, Thailand	—

1.2 Construction of the Policy Analysis Framework

To examine the development models and characteristics of policies across different countries, this study selected two dimensions—policy tools and injury prevention strategies—designated as X and Y dimensions respectively, to construct an analytical framework for community-based fall prevention intervention policies.

1.2.1 X-Dimension: Policy Tools Dimension Policy tools refer to the means adopted by governments and other actors to achieve policy objectives [14]. Introducing policy tools into policy text analysis can reflect the three-dimensional characteristics of policies, thereby better revealing their strengths and weaknesses and facilitating policy formulation and tool adjustment. The rational selection and combination of policy tools are fundamental guarantees for achieving the development goals of community-based fall prevention intervention programs. This study assumes that the key to developing community-based fall prevention intervention programs lies in coordinating the relationship

between service supply and demand, requiring full market vitality to allocate medical resources rationally. Therefore, Rothwell et al.' s [15] policy tool theory was adopted. This theory has a clear market orientation, emphasizing the government' s important role in creating policy environments. Three types of policy tools—demand-side, supply-side, and environmental-side—were used as the X-dimension to analyze community-based fall prevention intervention policy texts (Table 3).

1.2.2 Y-Dimension: Injury Prevention Strategies Dimension As an important public health issue, preventing falls among community-dwelling older adults requires scientific strategies in policy implementation. Analyzing only the selection and application of policy tools cannot fully reflect the priorities and highlights of community-based fall prevention intervention policies across countries, limiting their reference value for China' s community fall prevention programs. During the implementation phase of fall prevention interventions for older adults, China' s "Technical Guidelines for Fall Prevention Interventions for Older Adults" [16] recommends comprehensively implementing the "5E" injury prevention strategy comprising Education, Environmental modification, Engineering, Enforcement, and Evaluation strategies. Following the "5E"principles in community-based fall prevention interventions helps reduce and control injury and death events. However, since the five strategies have varying requirements for resource supply and environmental support, and are significantly influenced by national healthcare systems and welfare institutions, their application practices in different national contexts warrant further discussion. Therefore, this study adopted the "5E" injury prevention strategy as the Y-dimension (Table 4) to analyze the combination and utilization of policy tools targeting the five injury prevention strategies based on the practical transformation process of community-based fall prevention intervention policies.

1.3 Statistical Methods The READ (Ready materials, Extract data, Analyse data, Distil) policy analysis method [17] was applied to establish question lists, conduct reading analysis, extract textual information, and summarize the general situation of community-based fall prevention intervention policies across countries. NVivo 11 was used to perform bottom-up coding of statements from the 24 included policy documents: first, textual statements were coded as first-level nodes representing the 15 specific tools under the X-dimension; then, first-level node statements were organized and further coded as second-level nodes representing the three policy tools in the X-dimension and five injury prevention strategies in the Y-dimension. All Y-dimension coded reference points reflected policy tool information, but not all policy tools corresponded to injury prevention strategies; therefore, the number of Y-dimension reference points might be fewer than that of first-level X-dimension coded reference points. Quantitative analysis was combined to analyze the frequency and proportion of different coded reference points, while content analysis was applied to extract information on policy application status and priorities.

Results

2.1.1 Distribution of Policy Tools (X-Dimension)

There were 212 coded reference points in the X-dimension. Supply-side, environmental-side, and demand-side policy tools accounted for 40.6% (86/212), 45.3% (96/212), and 14.1% (30/212), respectively. Among supply-side policy tools, public service was most frequently used, accounting for 17.5% (37/212), while talent development and scientific/technical information support were less frequently used, accounting for 4.7% (10/212) and 5.7% (12/212), respectively. Among environmental-side policy tools, technical standards and goal planning were most frequently used, accounting for 10.8% (23/212) and 10.4% (22/212), respectively, while promotion and advocacy was least used, accounting for 6.1% (13/212). Among demand-side policy tools, medical insurance payment was most frequently used, accounting for 4.7% (10/212), while government procurement was least used, accounting for 0.5% (1/212) (see Table 5).

Among high-income countries, the United States and Germany most frequently applied public service tools under supply-side policy tools, accounting for 40.5% (17/42) and 13.8% (8/58), respectively. Singapore focused on infrastructure construction tools under supply-side policy tools, with an application proportion of 24.1% (7/29). Except for the lack of application of demonstration projects under demand-side policy tools, Japan applied the remaining 14 specific policy tools relatively evenly. Among non-high-income countries, Russia and Thailand most frequently applied environmental-side policy tools, with application proportions of 51.3% (20/39) and 55.6% (10/18), respectively.

2.1.2 Distribution of Injury Prevention Strategies (Y-Dimension)

There were 105 coded reference points in the Y-dimension. Education and prevention strategies and evaluation strategies accounted for the highest proportions at 31.4% (33/105) and 22.9% (24/105), respectively. Engineering strategies accounted for the lowest proportion at 5.7% (6/105), see Table 6 .

2.1.3 X-Y Dimension Cross-Analysis

Figure 1 [Figure 1: see original paper] illustrates the application of policy tools across the five injury prevention strategies. The X-Y dimension cross-analysis reveals uneven distribution of policy tool application across different strategies during current community fall prevention implementation. In education and prevention strategies, public services under supply-side tools were most frequently used, accounting for 21.0% (22/105). In evaluation strategies, technical standards under environmental-side tools were most frequently used, accounting for 9.5% (10/105). In enforcement strategies, regulation under environmental-side tools was most frequently used, accounting for 14.3% (15/105). In engineering strategies, both scientific/technical information support and public services under supply-side tools accounted for 1.9% (2/105) each. In environmental

modification strategies, infrastructure construction under supply-side tools was most frequently used, accounting for 11.4% (12/105).

2.2 Content Analysis Results of Policy Texts

Through further reading and analysis of X and Y dimension coded reference points, this study found that the degree of population aging is an important background factor determining early policy formulation in various countries. Additionally, differences exist among countries with different income levels regarding policy development stages, legal completeness, and multi-sectoral collaboration. Based on economic income classification, this can be summarized as a multi-sectoral collaborative policy implementation stage represented by high-income countries and a Ministry of Health policy formulation stage represented by non-high-income countries.

At the policy planning level, two countries issued separate national community-based fall prevention intervention policies and action plans (United States, Russia); three countries embedded community-based fall prevention interventions within national health promotion or preventive healthcare policies (Germany, Japan, Singapore); Thailand only published injury prevention guidelines for older adults, remaining at the agenda-setting stage. At the legal improvement level, Ministry of Health responsibilities include approving fall prevention guidelines (Russia, United States, Thailand), establishing national prevention working groups (Germany, Russia, Japan), developing financing schemes (Russia, Japan, Germany), and clarifying division of responsibilities among regions and institutions (United States, Russia, Germany, Japan). Germany and Japan incorporated community-based fall prevention interventions into medical insurance regulations, with financing, provision, and supervision by medical insurance funds. The United States revised the Supporting Older Americans Act [19], establishing special funds for evidence-based interventions and developing application, evaluation, and implementation procedures for evidence-based fall prevention programs. Thailand only issued regulations on basic rights protection for older adults. At the multi-sectoral collaboration level, Japan, Singapore, the United States, and Germany demonstrated high levels of cooperation by promoting joint actions among ministries of health, housing, social services, and other departments to reduce various fall risk factors among community-dwelling older adults, including physiological, environmental, psychological, and social factors. Russia and Thailand designated the Ministry of Health as the primary implementing department, with policy texts rarely involving multi-sectoral collaboration.

Discussion

3.1 Analysis of Supply-Side Policy Tool Application Models

The distribution of supply-side policy tools varies significantly across countries. Based on the completeness and development stage of community-based fall pre-

vention intervention policies, this study summarized three models of supply-side policy tools: First, the multi-factor comprehensive intervention model, represented by the United States, Germany, and Japan. The United States and Germany continuously implement targeted, interdisciplinary, evidence-based community multi-factor fall prevention programs [20-22]. Japan embedded fall prevention interventions for older adults into its national integrated system of health promotion and preventive care [23], with municipalities making dynamic adjustments to health promotion and disease prevention programs based on local annual physical examination data [24], covering multi-factor interventions including risk assessment, exercise, and nutrition. Second, the single-factor focused intervention model, represented by Singapore, which focuses on improving and eliminating environmental risk factors for falls among older adults [25-26], promoting barrier-free public environment construction and the "Enhancement for Active Seniors (EASE)" program for private residential aging-in-place modifications [27]. Third, the medical intervention model based on fall risk screening, illustrated by Russia and Thailand. Russia focuses on developing fall risk screening tools and providing medical intervention measures [28-29]; Thailand plans to embed fall prevention interventions for older adults into its national injury prevention work [30-31], providing fall risk screening and necessary medical interventions for hospital patients and physical examination populations.

3.2 Analysis of Environmental-Side Policy Tool Application Experience

This study found high consistency among the six countries in applying goal planning, organization and implementation, promotion and advocacy, and technical standards under environmental-side policy tools. First, regarding goal planning themes, policies elaborated on implementation timelines, geographic areas, target populations, and expected objectives. Russia' s policy direction specifies priority rankings for various action plans and establishes clear work schedules; the other five countries did not address priorities and phased tasks in their national policy texts. The target population generally comprises community-dwelling older adults aged 60 or 65 and above with self-care abilities, while disabled and frail older adults are covered by long-term care insurance systems (except in Thailand). The policy directions of the United States, Germany, and Singapore offer special subsidies or intervention programs for economically disadvantaged immigrants and ethnic minorities, providing reference experience for refining fall prevention services, expanding service coverage, and promoting health equity. Second, regarding organization and implementation themes, policies in four high-income countries directed multiple ministries—including health, social services, housing, and transportation—to jointly issue guidance documents, stipulating that medical institutions, insurance agencies, communities, and other social organizations (such as sports associations, cultural organizations, and volunteer groups) implement intervention policies, providing policy support for multi-factor interventions. Third, regarding promotion and advocacy themes, all six countries adopted a combination of offline lectures and

online promotion. Offline channels relied on communities, medical institutions, public squares, convenience stores, and fall prevention classrooms for face-to-face guidance; online channels utilized official websites, news media, video platforms, and health-related applications to distribute electronic fall prevention guides. Fourth, regarding technical standards themes, countries' policy directions included developing community-based fall risk assessment tools, issuing intervention guidelines, providing evidence-based support for intervention programs (United States, Germany), and constructing quality evaluation systems for intervention programs (United States, Germany, Japan, Russia). Fifth, regarding regulation themes, this tool has not been fully utilized in some countries. Drawing on the experiences of the United States, Germany, and Russia, targeted legal provisions and regulatory mechanisms facilitate scientific evaluation of policy implementation and intervention effectiveness, further safeguarding welfare for older adult populations.

3.3 Analysis of Demand-Side Policy Tool Application Models

Demand-side policies are direct drivers for developing community-based fall prevention intervention policies. Countries' application of these tools can be summarized into three models: The first model is medical insurance management, including Germany, Japan, and Russia. Germany designates a list of health insurance institutions and develops preventive service catalogs within its national prevention strategy policy framework, with medical insurance companies undertaking community fall prevention programs and covering organization, evaluation, and operational costs [22]. Japan integrates national health insurance, elderly health insurance, and long-term care insurance, with fall prevention services incorporated into this tripartite insurance system. Russia provides fall prevention services within the scope of its federal free medical services. Under this model, insured individuals need not purchase or participate in services from other organizations, offering convenient processes and strong public satisfaction, while medical insurance payments help standardize medical service behaviors and optimize medical resource allocation. The second model is financial fund establishment, represented by the United States, where specific forms include special funds under the Administration for Community Living providing grants to qualified evidence-based fall prevention programs. This initiative enriches service content and modalities, stimulates market vitality, and possesses considerable development potential and policy incentive effects. The third model is price subsidies, represented by Singapore. Through fiscal appropriations providing high-level price subsidies for fall prevention services [32], citizens' out-of-pocket portions are low, demonstrating the universal benefit of fall prevention services while advocating that citizens pay for health, thereby achieving the goal of enhancing national health awareness and promoting population health.

3.4 Current Status and Implications of Injury Prevention Strategy Application

Across all sample countries, education and prevention strategies and environmental modification strategies are the main intervention approaches adopted in community fall prevention programs. Examples include evidence-based fall prevention programs in the United States, fall prevention courses in Germany, the "Enhancement for Active Seniors (EASE)" housing renovation program in Singapore, and fall prevention schools in Russia. These all apply education and prevention strategies such as exercise interventions, health education, and medication management, as well as environmental modification strategies including home environment renovation and community public area aging-in-place modifications. Specific practices in evaluation strategies include implementing unified national standards for intervention measure execution norms, intervention effectiveness evaluation, and fall risk screening procedures. For instance, the United States, Russia, and Thailand developed nationally applicable fall screening tools based on evidence-based principles; Singapore established national barrier-free environment standards; and Japan regularly uses physical examination data to evaluate older adults' health status to guide annual interventions. Experience with enforcement strategies primarily involves issuing special legal provisions, improving government regulatory systems, and providing public supervision channels. Germany offers a noteworthy model in applying this strategy by enacting the "Act to Strengthen Health Promotion and Disease Prevention," which standardizes the entire process of intervention program development, implementation, and evaluation, thereby ensuring policy priority and authority. The six countries' application of engineering strategies was weakest. On one hand, fall prevention technology products are mainly developed by research institutions and enterprises, with limited mention in national policy texts. On the other hand, current application of engineering strategies is confined to small-scale regional pilots with weak promotion and high costs. Governments should emphasize the promotion of engineering strategy achievements while promoting education and prevention and evaluation strategies, fully applying demand-side tools such as price subsidies, government procurement, and medical insurance payments to supply reasonably priced, safe, and effective technology products for older adults in need.

3.5 Current Status and Implications of Policy Tool-Injury Prevention Strategy Application

Two-dimensional cross-analysis revealed that education and prevention, engineering, and environmental modification strategies had the highest proportion of supply-side tool application; evaluation and enforcement strategies most frequently applied environmental-side tools; demand-side tools were less applied in implementing the "5E" injury prevention strategies. These differences reflect both government application preferences and the applicable scope and limitations of different policy tools. When formulating and implementing edu-

cation and prevention and environmental modification strategies, national governments primarily adopted supply-side tools, focusing on supporting public services and infrastructure construction. This demonstrates favorable policy orientation toward promoting regional equalization of community fall prevention services and safeguarding vulnerable groups' rights. However, the structural distribution of supply-side tools was unbalanced, mainly manifested by insufficient application of talent development, with no clear specifications regarding practitioner numbers, competencies, and qualifications, and low application proportions for scientific/technical information support and financial investment. These phenomena suggest that to leverage supply-side tools' driving effect on education and prevention and environmental modification strategies: first, government provision of public services and facility improvements should facilitate fall prevention program implementation and narrow regional gaps; second, emphasis should be placed on practitioner education, training, and qualification access to build a scientific and rational talent pipeline; third, information service platforms should be established to simplify older residents' participation processes in fall prevention services using information technology.

Evaluation strategies showed the highest proportion of technical standards under environmental-side tools. Research indicates that evidence-based policy formulation and evaluation represent future policy development directions, yet significant challenges remain across countries due to lack of resources, technical means, and accountability mechanisms [33]. Therefore, community-based fall prevention intervention policies should issue implementation details, evaluation indicators, and assessment systems guided by evidence, using the positive influence of environmental-side tools to strengthen evaluation strategy effectiveness. Second, environmental-side tools should be continuously optimized based on policy implementation progress and effectiveness obtained through evaluation strategies.

Demand-side tools were less applied to the "5E" prevention strategies, with only government procurement and price subsidies being utilized. Demand-side tools drive related service development by reducing unstable factors affecting service development and expanding service markets. The "5E" prevention strategies serve as intervention measures during policy implementation, manifesting as various service forms and content. Balanced application of demand-side tools helps expand development space for the "5E" prevention strategies, enrich service content and modalities, reduce fiscal pressure, and ensure sustainable development of fall prevention programs. In national policies, demand-side tools are appropriately applied to overall program planning and used in conjunction with environmental-side and supply-side tools to exert their incentive effects, as described in the three demand-side tool application models summarized earlier.

Limitations and Future Directions

This study analyzed and evaluated national policy texts from Japan, the United States, Germany, Singapore, Russia, and Thailand that are currently being for-

mulated or implemented, using policy tools and injury prevention strategies as assessment frameworks to identify strengths and weaknesses in current fall prevention policies. This study has several limitations. First, the text search did not include regional policy documents or publicly published academic papers from each country; therefore, federal/state policies issued by federal system countries (United States, Germany, Russia) and regional pilot results (Japan, Thailand, Singapore) could not be examined in this study. Additionally, limited by language factors, this study only selected six representative countries as samples, which cannot represent the global progress of fall prevention-related policies. Based on this foundation, future research can further explore regional policy formulation, implementation, and scientific evaluation across countries, applying quantitative methodologies from an evidence-based perspective to verify policy implementation effectiveness and analyze emerging problems, thereby providing experience and reference for future policy revisions in China.

Author Contributions

GU Hanxin: Proposed the research direction, collected materials, and wrote the manuscript.

LIU Yang: Responsible for quality control and revision of the article.

LIU Yuanli: Had overall responsibility for the article and supervised the study.

Conflict of Interest

This article has no conflict of interest.

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Received: 2023-02-21

Revised: 2023-05-19

Edited by: ZHANG Yali

Note: Figure translations are in progress. See original paper for figures.