Accepted Article

Journal of Frailty, Sarcopenia and Falls

Original Article

Development and Initial Evaluation of a National Judo-Based Instructor Training Program for Fall Injury Prevention in Older Adults: Acceptability and Perceived Barriers to Community Implementation

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Abstract

Objectives: To describe the national Fall Injury Prevention Instructor training program of the All Japan Judo Federation and to identify facilitators of, and barriers to, community implementation perceived by newly certified instructors. **Methods**: Mixed-methods evaluation of eight courses delivered across Japan between October 2024 and June 2026. The 7-hour program comprised on-demand lectures, a knowledge test, face-to-face lectures, role-playing exercises, and a certification examination. An anonymous post-course questionnaire collected occupation and course evaluations; free-text responses underwent inductive qualitative content analysis. **Results**: Of 191 attendees, 151 (79.1%) responded. Overall satisfaction was high (96.7% positive), but perceived feasibility of community implementation was lower (70.9%) and varied by occupational background (42.9%–86.7%). Content analysis of 520 meaning units from 116 respondents yielded six themes. Facilitators were multi-professional dialogue and facilitator support; barriers were limited real-world teaching experience, self-perceived gaps in medical and risk-assessment competence, operational constraints (venue, insurance, staffing, funding), and absence of post-certification support. No respondent described judo-based training as culturally inappropriate for older adults. **Conclusions**: This short, scalable national program was highly acceptable. The barriers identified were operational and competence-related rather than cultural. Certification should be accompanied by supervised practical experience, objective risk-assessment tools, and post-course mentoring and implementation resources.

Keywords: Older people, Breakfall, Community implementation, Train-the-trainer, Implementation science

The authors have no conflict of interest.

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Edited by: *Dawn Skelton*

Accepted *29 September 2026*

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Introduction

Falls are a major public health problem in older adults and are associated with fractures, head injuries, loss of independence, institutionalization, and mortality[1]. The World Health Organization has emphasized that fall prevention in older age requires strategies including education, risk assessment, environmental modification, and exercise-based interventions[2]. Recent world guidelines also identify fall-related injuries as an important cause of morbidity, disability, hospitalization, and death in older adults and recommend multifactorial assessment and tailored interventions for individuals at increased risk[3].

Exercise is a core strategy for preventing falls in community-dwelling older adults. A Cochrane review showed that exercise programs reduce both the rate of falls and the number of people experiencing falls, with balance and functional training being important components of effective programs[4]. However, most conventional fall-prevention programs primarily aim to reduce the occurrence of falls. Fewer approaches directly address how to reduce injury once a fall has occurred. Fall-related injuries depend not only on whether a person falls, but also on body orientation, impact location, impact force, and protective responses during landing.

Judo may provide a complementary approach to this problem. Judo includes balance, strength, coordination, and flexibility training, as well as safe landing techniques known as *ukemi*. Ukemi techniques are designed to control body position, disperse impact forces, and avoid direct impact to vulnerable body regions during a fall. A recent Global Consensus Statement on judo-based interventions for older adults outlined recommendations for implementing judo-based fall-prevention programs and emphasized collaboration among judo federations, healthcare providers, and community organizations[5]. A recent editorial further highlighted that conventional fall-prevention strategies mainly focus on reducing fall incidence, whereas injury mitigation through safe falling has received less attention[6]. Biomechanical studies also suggest that martial arts fall techniques can be learned and may reduce impact forces during falls[7]. Thus, judo-based safe falling techniques may complement conventional fall-prevention strategies by addressing injury mitigation after loss of balance has occurred.

Previous studies have examined the feasibility and potential benefits of judo-based exercise in middle-aged and older adults. Reviews have reported improvements in physical performance, strength, flexibility, bone mineral density, fear of falling, quality of life, and other health-related outcomes, although the available evidence remains limited by small sample sizes and methodological heterogeneity[8-10]. Intervention studies have also demonstrated the feasibility of adapted judo-based programs in community-dwelling older adults[11-13].

Wider dissemination, however, requires not only an appropriate exercise protocol but also a workforce capable of delivering these programs safely and consistently. Experience in judo does not in itself indicate competence to teach safe falling to older adults. In an international survey of 470 judo coaches, only 40.6% had any experience of coaching older adults, and coaches reported educational needs that exceeded their self-rated knowledge across every domain examined, including safety and first aid, physiology and fitness, and teaching methodology[14]. Structured instructor education is therefore a prerequisite rather than an optional addition.

Train-the-trainer approaches are well established in fall prevention more broadly, and a growing number have been applied specifically to judo-based safe falling. In Sweden, the FallFitness program educated older peer leaders over three days of combined theory and practical training, supported by weekly one-hour consultations and a program handbook during delivery; the peer-led program improved falling technique, physical activity, and fear of falling in a randomized controlled trial[15]. A subsequent qualitative study of those peer leaders identified the training format, the physical training environment, and collaboration with community organizations as determinants of sustainability[16]. In Australia, a train-the-trainer intervention combining a 13-hour, two-day workshop with eight weeks of supervised practical teaching improved perceived competence, objective knowledge, and the trainees own safe falling skills among allied health professionals and judo coaches[17]. More generally, a scoping review of community fall-prevention exercise implementation identified instructor training, instructor confidence, ongoing professional support, funding, materials, and space as recurrent determinants of whether programs are delivered at all[18].

What is not yet known is whether such approaches can be scaled to a national workforce, and what newly trained instructors themselves regard as the obstacles to delivering programs in their own communities. To address this, the All Japan Judo Federation (AJJF) established a certified Fall Injury Prevention Instructor qualification system. The present study aimed to (i) describe the development and content of this national instructor training program, (ii) evaluate its acceptability among trainees, and (iii) identify the facilitators of, and barriers to, community implementation perceived by newly certified instructors.

Materials and Methods

Study design

This was a cross-sectional, mixed-methods program evaluation. Quantitative and qualitative data were collected concurrently through a single anonymous post-course questionnaire and were integrated at the interpretation stage. The quantitative component described the acceptability of the training course; the qualitative component explored the facilitators and barriers to

Panel A. Demographic characteristics	
Variable	**Value**
Number of respondents	151
Age, years	50.4 ± 13.4
Age range, years	20-80
Men	129 (85.4%)
Women	22 (14.6%)
20s	10 (6.6%)
30s	20 (13.2%)
40s	39 (25.8%)
50s	45 (29.8%)
60s	25 (16.6%)
70s	11 (7.3%)
80s	1 (0.7%)

Panel B. Occupation and perceived feasibility of community implementation		
Occupation (multiple responses allowed)	**Respondents, n (%)**	**Perceived feasibility of community implementation, positive response n (%)**
Judo instructor or coach	60 (39.7)	43 (71.7)
Judo therapist (judo-seifukushi)	51 (33.8)	37 (72.5)
Other healthcare or care professional	15 (9.9)	13 (86.7)
School or university teacher	14 (9.3)	12 (85.7)
Judo athlete	6 (4.0)	5 (83.3)
Athletic trainer	4 (2.6)	3 (75.0)
Student	2 (1.3)	1 (50.0)
Other occupation	21 (13.9)	9 (42.9)

Values are presented as n (%) or mean ± standard deviation. Occupation was a free-text item and was coded into categories after data collection; 20 respondents (13.2%) reported more than one occupation, so categories are not mutually exclusive and percentages sum to more than 100%. A positive response was defined as a score of 4 or 5 on the 5-point Likert scale for perceived feasibility of community implementation.

Table 1. Participant characteristics.

community implementation described by trainees in their own words. Reporting of the qualitative component follows the Consolidated Criteria for Reporting Qualitative Research (COREQ)[19].

The study protocol was approved by the Ethics Committee of Tokai Gakuen University (approval number: 2025-26) and was conducted in accordance with the Declaration of Helsinki. All participants were informed of the study purpose, voluntary nature of participation, anonymity, and publication of aggregated results. Because the questionnaire was anonymous, submission of the online questionnaire was regarded as consent to participate.

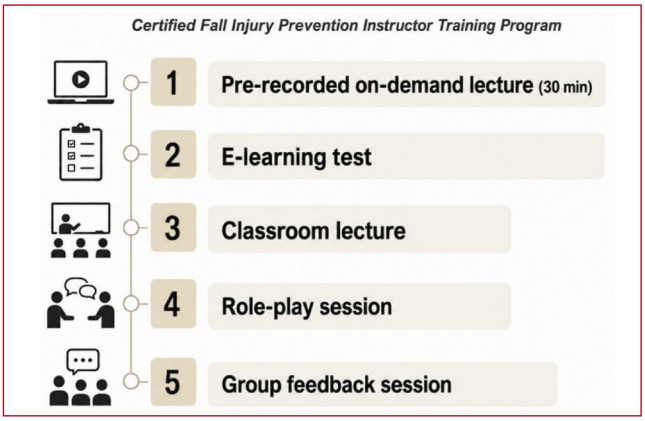


Figure 1. Overview of the instructor training program.

Item	n	Median [IQR]	Positive response, n (%)
On-demand lecture content	93	5 [4-5]	83 (89.2)
Face-to-face lecture content	151	5 [4-5]	138 (91.4)
Role-playing content	151	5 [4-5]	139 (92.1)
Staff support during role-playing	151	5 [5-5]	145 (96.0)
Feasibility of community implementation	151	4 [3-5]	107 (70.9)
Overall satisfaction	151	5 [4-5]	146 (96.7)
Willingness to recommend the course	151	5 [4-5]	133 (88.1)

Values are presented as median [interquartile range] or n (%). A positive response was defined as a score of 4 or 5 on a 5-point Likert scale. The full distribution of responses is shown in Supplementary Table 1.

Table 2. Course evaluation.

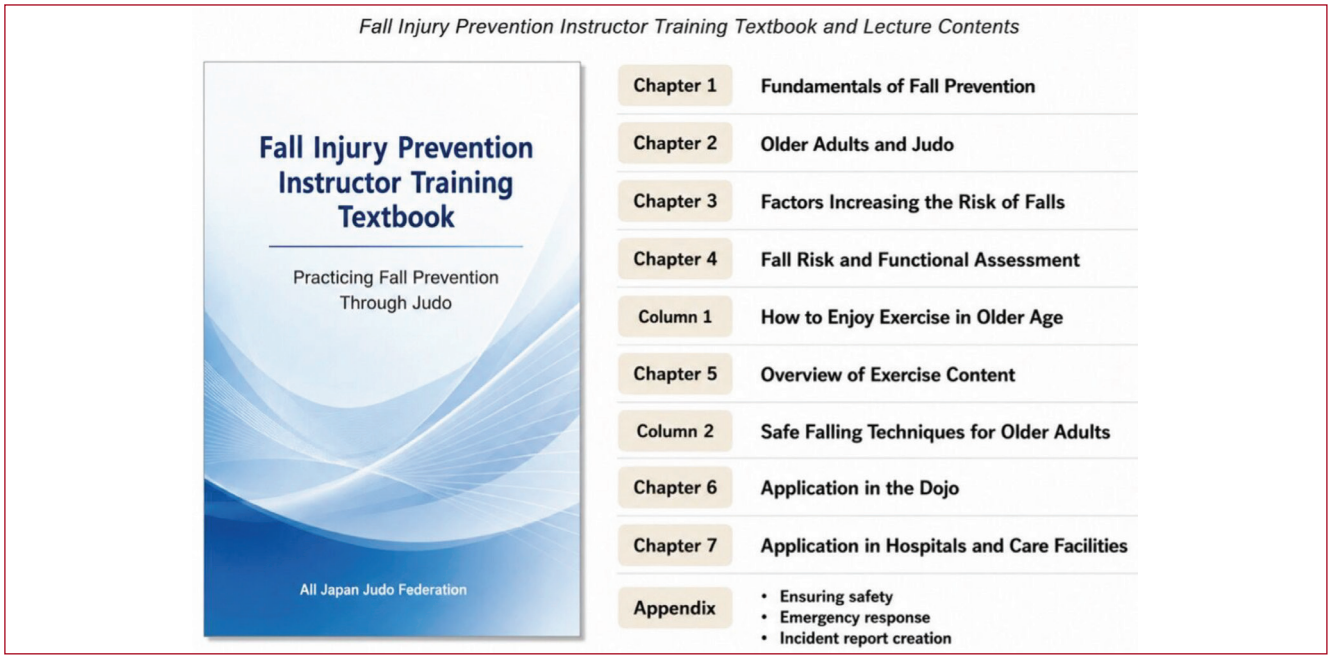


Figure 2. Overview of the textbook and lecture contents.

Development of the qualification system and training program

The qualification system and its curriculum were developed in 2024 by the Fall Injury Prevention Special Committee of the AJJF, a committee composed of members holding healthcare qualifications — physicians, a physiotherapist, a nurse, and a judo therapist — several of whom also have experience as judo coaches, and all of whom had previously delivered judo-based fall-prevention classes for older adults. The stated aim was to enable instructors without a medical background, in particular judo instructors, to deliver exercise instruction to older adults safely and with adequate knowledge. The curriculum and training manual were developed over approximately six months across about ten committee meetings, drawing on the Global Consensus Statement on judo-based interventions for older adults[5], the published literature on judo-based exercise programs for older adults[8-13], and the committee members' own experience of running community classes. Before national rollout the program

was piloted with four trainees to confirm feasibility; the pilot participants were also certified and are included in the numbers reported below.

Instructor qualification system

The certified Fall Injury Prevention Instructor qualification system was established by the AJJF to train instructors and maintain their competency, thereby contributing to the extension of healthy life expectancy and the dissemination and development of judo in Japan.

To obtain certification, participants were required to complete all on-demand lectures, pass the e-learning knowledge confirmation test, attend the entire face-to-face session, and pass a certification examination administered separately from the knowledge confirmation test. Candidates who did not reach the pass mark were offered a re-examination on the same day; all candidates ultimately passed. The qualification was valid until end of March after the first anniversary of certification and could be renewed annually by completing a renewal course and meeting the renewal conditions.

Content and delivery of the training course

The instructor training course consisted of pre-course on-demand lectures, an e-learning knowledge confirmation test, face-to-face lectures, role-playing exercises, and group presentations with feedback (Figure 1). The total duration was approximately 420 minutes (7 hours): six on-demand video lectures of 10 to 15 minutes each (approximately 90 minutes in total), a 30-minute knowledge confirmation test, and a 300-minute face-to-face session comprising 60 minutes of lectures, 180 minutes of role-playing exercises, and 60 minutes of group presentations and feedback. The allocation of time across components is summarized in Supplementary Table 2.

The on-demand and face-to-face lectures covered knowledge required for fall injury prevention instruction, including the epidemiology and definition of falls, fall-prevention strategies, health-related effects of judo in older adults, medical conditions and medications associated with fall risk, functional assessment, exercise programming, safety management, emergency response, and accident reporting (Figure 2). These contents were supported by a 56-page training manual comprising a preface, seven chapters, two columns, and an appendix. It covers the fundamentals of fall prevention, judo and older adults, medical conditions and medications that increase fall risk, fall-risk and functional assessment, the structure and practical application of the exercise program, and safety assurance, emergency response, insurance, and accident reporting. An English translation of the table of contents is provided as Supplementary Table 3.

The practical component consisted of role-playing exercises in which participants planned a fall injury prevention class for hypothetical older adults with defined medical histories and functional limitations, and discussed program structure, risk assessment, exercise content, safety considerations, and instructional methods. The role-playing format was intended to help participants apply knowledge acquired in the lectures to realistic community-based settings. The course did not include a scheduled block of supervised practical instruction in ukemi on the mat. Role-playing was nonetheless conducted in a judo dojo, and some groups chose to try out breakfall techniques or other exercises while developing their plans; trainees' own safe falling skills were not assessed.

Course instructors and facilitators

All on-demand lectures, face-to-face lectures, and role-playing facilitation were delivered by members of the AJJF Fall Injury Prevention Special Committee described in Section 2.2. Every facilitator therefore held both a judo dan grade and either a medical, nursing, rehabilitation, or judo therapy qualification, and every facilitator had previous experience of running community fall-prevention classes for older adults. The committee comprises seven members: four physicians (two orthopaedic surgeons, one gastrointestinal surgeon, and one specialist in metabolic medicine), one physiotherapist, one nurse, and one judo therapist; their judo grades range from 1st to 6th dan, and three also have experience as judo coaches. Group size was capped at six trainees per facilitator.

Participants and recruitment

Courses were advertised on the AJJF website, by email to registered AJJF judo instructors, and through prefectural judo therapist associations. Eligibility required registration as an AJJF judo instructor or a national healthcare license. Course content and certification requirements were identical for all participants regardless of professional background. Eight courses were delivered between October 2024 and June 2026 at five locations: Tokyo, Osaka, Kyoto, Aichi, and Hokkaido. In total, 191 individuals attended (mean approximately 24 per course), of whom 151 completed the questionnaire and were included in the analysis (Table 1).

Questionnaire survey

After completion of the course, participants were invited to complete an anonymous online questionnaire. Participation was voluntary.

The questionnaire collected demographic information, including age, sex, and occupation, as well as evaluations of the training course. Course evaluation items included satisfaction with the on-demand lectures, face-to-face lectures, role-playing exercises, confirmation test, overall course, staff support, willingness to recommend the course to others, and perceived feasibility of implementing the program in the local community. Five open-ended items invited free-text comments on the on-demand lectures,

Theme	Subtheme	Respondents, n (%)	Mean feasibility score	Illustrative quotation (translated)
1. Multi-professional dialogue was the most valued element	1.1 Value of exchanging views across occupations and perspectives	62 (41.1)	3.89	"It was very meaningful to exchange views with teachers from different professions and different viewpoints."
	1.2 Facilitator and staff support enabled contribution	13 (8.6)	3.92	"When we were about to get stuck, the support staff gave us small hints, which made it easy to move forward."
	1.3 Role-playing made community delivery concrete	14 (9.3)	4.07	"Doing the role-play gave me an image of what holding a class in my community would look like."
2. Gap between classroom simulation and real-world delivery	2.1 Wish to observe or assist at real community classes	8 (5.3)	3.50	"I think I would gain confidence by observing and helping out somewhere it is actually being done."
	2.2 Requests for concrete practice examples, cases and video	19 (12.6)	3.79	"If there had been an introduction of actual cases with video at the end, I could have pictured it much better."
	2.3 Uncertainty about own readiness and plan validity	6 (4.0)	2.83	"Of course I want to do this with confidence after this course, but honestly I cannot do it without the cooperation of those around me."
3. Self-perceived insufficiency of medical competence	3.1 Difficulty with medical knowledge and terminology	11 (7.3)	3.64	"I have the knowledge and skills of a judo instructor, but I felt that my medical knowledge about older adults was insufficient."
	3.2 Need for objective risk-assessment criteria and tools	11 (7.3)	3.55	"Risk judgement is subjective and varies between instructors, so we need more objective indicators and a checklist allowing an absolute evaluation."
	3.3 Exercise intensity and criteria for stopping exercise	4 (2.6)	3.00	"I would like guidance on how much load to apply, and on criteria for stopping exercise in order to ensure safety."
4. Operational and resource constraints	4.1 Recruiting participants and raising awareness	7 (4.6)	3.71	"How to recruit participants, deal with local government, prepare the environment and secure staff."
	4.2 Venue, equipment, travel and geographical access	8 (5.3)	3.62	"Some people gave up attending because of the distance. Please hold more courses in the regions."
	4.3 Cost, insurance, assistants and external partnership	4 (2.6)	2.75	"Insurance for participants and travel expenses for assistants would come out of my own pocket… Please include guidance on how to write a proposal to the municipality."
5. Need for continuing support after certification	5.1 Post-course network and information sharing	11 (7.3)	3.73	"It would be good to have opportunities for exchange and information sharing among instructors after holding a class."
	5.2 Renewal, refresher training and advanced qualification	7 (4.6)	4.57	"If there were a higher-level qualification it would be easier to speak about this in my own area."
	5.3 Shared repository of practice examples and publicity materials	8 (5.3)	3.88	"I would like the ideas to be uploaded to the AJJF website."
6. Requests to extend scope and refine delivery	6.1 Extension to children, schools and people with disabilities	8 (5.3)	4.00	"I would also like to study fall injury prevention for people with physical disabilities."
	6.2 Course logistics: hands-on time, materials, pacing, review access	22 (14.6)	3.77	"Since we had gathered so many ideas, I wanted a little more time to move our bodies together and experience them."

A total of 520 substantive meaning units were identified across five open-ended items, contributed by 116 of 151 respondents (76.8%). Respondents could contribute to more than one subtheme, so numbers are not mutually exclusive. The mean feasibility score is the mean rating of perceived feasibility of community implementation (5-point Likert scale) among the respondents contributing to that subtheme; the mean for the whole sample was 3.98. Quotations were translated from Japanese.

Table 3. Themes and subthemes derived from inductive content analysis of free-text responses.

the face-to-face lectures, the role-playing exercises, the confirmation test, and on topics or arrangements that respondents would like to see in future.

Most course evaluation items were assessed using a 5-point Likert scale, with higher scores indicating more positive responses. Items regarding the on-demand lectures, and the item asking whether respondents wished to serve as course tutors in future training courses, were added to the questionnaire after data collection had begun, and were therefore presented only to the 93 participants who completed the later version. The course curriculum itself was not modified during the study period.

Outcome measures

The primary outcomes were participant satisfaction with the overall training course and perceived feasibility of community implementation. Secondary outcomes included satisfaction with individual course components, staff support, willingness to recommend the course, and the facilitators of and barriers to community implementation identified through qualitative analysis of the free-text responses.

Data analysis

Participant characteristics and questionnaire responses were summarized descriptively, using means and standard deviations for continuous variables and frequencies and percentages for categorical variables. Likert-scale responses were summarized as medians with interquartile ranges and as frequencies and percentages, and responses of 4 or 5 were defined as positive. For time allocation and test difficulty, the full response distribution is reported because the midpoint represented an appropriate duration or difficulty level. Occupation was analysed as a multiple-response variable, and perceived feasibility was additionally summarized by occupational category. Analyses were performed using Python version 3.11. No hypothesis testing was planned because the study was descriptive.

Free-text responses to the five open-ended items were analysed using inductive qualitative content analysis[20]. The unit of analysis was a meaning unit, defined as a phrase or sentence conveying a single idea; responses consisting solely of a non-substantive expression (for example, “nothing in particular”) were excluded. Two authors (AI and NS) independently coded all responses and grouped codes into subcategories and then into themes, resolving discrepancies by discussion; no inter-rater reliability coefficient was calculated. Themes were developed inductively and were mapped against the determinants reported in the community fall-prevention implementation literature[18] only at the interpretation stage. Analysis was conducted in Japanese, and illustrative quotations were translated into English by the first author and checked by a second bilingual author. For each theme, the number of contributing respondents and their perceived feasibility scores are reported so that the qualitative and quantitative findings can be read together.

Results

Participant characteristics

During the study period, 191 individuals attended the instructor training course, of whom 151 completed the post-course questionnaire and were included in the analysis (response rate, 79.1%). The mean age of respondents was 50.4 ± 13.4 years (range, 20–80 years). Most respondents were men (n = 129, 85.4%). The most common age group was the 50s (n = 45, 29.8%), followed by the 40s (n = 39, 25.8%) and 60s (n = 25, 16.6%). Occupation was reported by all respondents and is summarized in Table 1. Because 20 respondents (13.2%) reported more than one occupation, categories are not mutually exclusive. The largest groups were judo instructors or coaches (n = 60, 39.7%) and judo therapists (judo-seifukushi, a nationally licensed manual therapy profession in Japan; n = 51, 33.8%), followed by other healthcare or care professionals (nurses, physiotherapists, physicians, acupuncturists, certified care workers, and care managers; n = 15, 9.9%), school or university teachers (n = 14, 9.3%), judo athletes (n = 6, 4.0%), athletic trainers (n = 4, 2.6%), and students (n = 2, 1.3%). A further 21 respondents (13.9%) reported occupations outside these categories, including company employees, self-employed workers, public servants, a firefighter, a prison officer, a welfare commissioner, and a sports facility manager. Two-thirds of respondents therefore held either a judo teaching role or a licensed health or care qualification.

Evaluation of the training course

Overall satisfaction with the training course was high, with a median score of 5 [IQR, 4–5]; 146 participants (96.7%) selected 4 or 5 on the 5-point Likert scale. Willingness to recommend the course to others had a median score of 5 [IQR, 4–5], with 133 participants (88.1%) selecting 4 or 5. Face-to-face lecture content had a median score of 5 [IQR, 4–5], with 138 participants (91.4%) selecting 4 or 5. Among the 93 participants who received questionnaire items regarding the on-demand lectures, on-demand lecture content had a median score of 5 [IQR, 4–5], with 83 participants (89.2%) selecting 4 or 5. Course evaluation results are summarized in Table 2, and the full distributions of Likert-scale responses are presented in Supplementary Table 1.

Evaluation of role-playing exercises and community implementation

Role-playing content had a median score of 5 [IQR, 4–5], with 139 participants (92.1%) selecting 4 or 5. Staff support during role-playing received the highest proportion of positive responses, with a median score of

5 [IQR, 5–5] and 145 participants (96.0%) selecting 4 or 5. Perceived feasibility of community implementation had a median score of 4 [IQR, 3–5], with 107 participants (70.9%) selecting 4 or 5. This proportion was lower than those observed for overall satisfaction, role-playing content, and staff support. Perceived feasibility differed by occupational background (Table 1). Positive responses were reported by 12 of 14 school or university teachers (85.7%), 13 of 15 other healthcare or care professionals (86.7%), 37 of 51 judo therapists (72.5%), and 43 of 60 judo instructors or coaches (71.7%), but by only 9 of 21 respondents (42.9%) whose occupation fell outside the health, education, judo-coaching, or athletic-training categories.

Time allocation and test difficulty

For the time allocation of the on-demand lectures, 83 of 93 respondents (89.2%) selected the midpoint score of 3. For face-to-face lecture time, 130 of 151 participants (86.1%) selected 3, and for role-playing time, 128 of 151 participants (84.8%) selected 3.

For test difficulty, 92 participants (60.9%) selected the midpoint score of 3. The median score for test difficulty was 3 [IQR, 3–3]. Full response distributions for these items are presented in Supplementary Table 1.

Willingness to serve as course tutors

The item asking whether respondents wished to serve as course tutors in future training courses was presented only to the 93 participants who completed the later version of the questionnaire. Of these, 44 (47.3%) answered yes and 49 (52.7%) answered no. Willingness to act as a tutor was not closely related to perceived feasibility of community implementation: among the 93 respondents, 36 of 44 who answered yes and 35 of 49 who answered no had rated feasibility 4 or 5.

Facilitators and barriers to community implementation

A total of 520 substantive meaning units were identified across the five open-ended items, contributed by 116 of the 151 respondents (76.8%). Six themes with 17 subthemes were developed; all are presented with respondent counts, mean perceived feasibility scores, and illustrative quotations in Table 3.

The most frequently coded theme concerned the course as a multi-professional learning experience. Sixty-two respondents (41.1%) described the value of exchanging views with people from different occupations and perspectives, 13 (8.6%) credited the facilitators with enabling their contribution, and 14 (9.3%) reported that role-playing had made community delivery concrete.

Three themes described barriers, and the respondents contributing to them had lower perceived feasibility scores than the sample as a whole (mean 3.98). The first was a gap between classroom simulation and real-world delivery: 19 respondents (12.6%) requested concrete examples, case reports or video of actual classes, eight (5.3%) asked to observe or assist at real classes (mean 3.50), and six (4.0%) expressed uncertainty about their own readiness (mean 2.83). One wrote: “Of course I want to do this with confidence after this course, but honestly I cannot do it without the cooperation of those around me.” The second was self-perceived insufficiency of medical competence among instructors from a judo background: 11 respondents (7.3%) reported difficulty with medical knowledge or terminology, 11 (7.3%) called for objective risk-assessment criteria (mean 3.55), and four (2.6%) asked for guidance on exercise intensity and on criteria for stopping exercise (mean 3.00). The third was operational and resource constraints: recruitment and public awareness (seven respondents), venue, equipment, travel and geographical access (eight), and cost, insurance, assistant staffing and partnership with local government (four). This last subtheme had the lowest mean feasibility of any subtheme (2.75); one respondent wrote: “Insurance for participants and travel expenses for assistants would have to come out of my own pocket. I am thinking of asking my municipality to cover these costs… Please include guidance on how to write such a proposal.”

Two further themes concerned what should follow certification and how the course might develop. Eleven respondents (7.3%) asked for a post-course network or a channel for questions and eight (5.3%) for a shared repository of practice examples, while seven (4.6%) asked about renewal, refresher training or an advanced qualification; none of these seven had rated feasibility below 4 (mean 4.57). Eight respondents (5.3%) proposed extending the approach to children, schools or people with physical disabilities, and 22 (14.6%) made suggestions about course delivery, most commonly a request for more time moving on the mat.

Across all 151 respondents, no free-text response described judo-based training as culturally or socially inappropriate for older adults, and none questioned its acceptability to older people themselves.

Discussion

This study described the development and delivery of a national certified instructor training system for judo-based fall injury prevention and evaluated its acceptability and perceived barriers to community implementation. The course was highly acceptable, with 96.7% of respondents reporting high overall satisfaction and 88.1% indicating that they would recommend it. In contrast, only 70.9% rated implementation in their own community as feasible. The qualitative findings help explain this gap. No free-text response questioned the appropriateness of judo-based training for older adults; instead, the concerns raised were mainly related to readiness for real-world delivery, medical

and risk-assessment competence, practical resources, and the lack of support after certification. These findings suggest that certification alone may not be sufficient to translate judo-based fall injury prevention into community practice.

The implementation barriers identified in this study are consistent with those reported more broadly in community fall-prevention programs. A scoping review using the Consolidated Framework for Implementation Research identified instructor capability and confidence, access to training materials and ongoing professional support, funding, equipment, and space as recurrent determinants of implementation[18]. Similar issues emerged in the present national judo-based program. This suggests that the principal challenges are not necessarily unique to judo, but overlap substantially with those encountered in other community exercise interventions. Importantly, no respondent spontaneously identified cultural or social inappropriateness of judo-based training for older adults as a concern, although the questionnaire was not specifically designed to investigate cultural acceptability.

Comparison with previously reported judo-based train-the-trainer programs is informative. The Swedish FallFitness program incorporated several days of theory and practical training together with ongoing consultation and written resources, while the Australian program combined a two-day workshop with eight weeks of supervised practical teaching[15-17]. Both emphasized opportunities to practise skills and receive support during real-world delivery. In contrast, the AJJF program was shorter, lasting approximately 7 hours, included no scheduled supervised practice of ukemi on the mat, assessed knowledge rather than practical skill, and did not provide structured post-certification mentoring. However, it was delivered at considerably larger scale, certifying 191 participants through eight courses at five locations within 20 months and at no cost to trainees. These differences suggest a potential trade-off between scalability and training intensity. A short national course can achieve high acceptability and rapidly expand the instructor workforce, but supervised practice, skill assessment, and ongoing mentoring may be necessary to improve confidence in actual community delivery.

Occupational background also appeared to influence perceived feasibility. Participants with health, care, or education backgrounds generally reported higher feasibility, whereas those without a health, education, or coaching background reported the lowest levels. Judo instructors and coaches, who represented the largest group and were a principal target of the qualification system, were intermediate. This pattern is consistent with an international survey in which only 40.6% of judo coaches had experience of coaching older adults and educational needs exceeded self-rated knowledge across all domains examined[14]. It is also consistent with the Australian train-the-trainer study, in which judo coaches and allied health professionals entered training with different professional strengths and training needs[17]. These findings support the multidisciplinary approach proposed in the Global Consensus Statement[5] and suggest that future instructor education may benefit from additional or differentiated content according to professional background.

The qualitative findings also identify several practical ways to strengthen the qualification system. Although risk assessment, safety management, emergency response, and insurance are already covered in the training manual, participants requested more objective criteria, clearer thresholds, and practical guidance that could be used when screening real participants. This suggests that knowledge-based teaching should be complemented by operational decision tools. Standardized screening checklists, explicit criteria for modifying or stopping exercise, model documentation, and practical guidance on insurance and collaboration with municipalities may therefore be more useful than simply adding further lecture content. Similarly, the high evaluation of role-playing suggests that interactive learning is valued, but requests to observe or assist in actual classes indicate that simulation alone may not fully prepare trainees for community delivery. Supervised practical sessions, observation of established programs, and structured mentoring after certification are therefore logical priorities for future course development.

Safety remains central when adapting ukemi-based training for older adults. Falling techniques should not be applied uniformly to all participants, and instructors need to modify exercise selection and progression according to physical function, medical risk, fear of falling, and the training environment[6]. The importance of controlling head motion and avoiding direct head impact is also supported by biomechanical evidence on head acceleration in combat sports[21]. The present findings reinforce the need for practical safety resources that can be applied consistently by instructors with different professional backgrounds.

This study has several limitations. First, it used a cross-sectional post-course questionnaire and therefore assessed participant perceptions at a single time point; long-term knowledge retention, instructor competence, actual implementation, and behavioural change were not evaluated. Second, outcomes were self-reported and may have been affected by response or social desirability bias, and 40 of 191 attendees did not respond. Third, the study did not assess teaching competence, trainees' own safe falling skills, or delivery fidelity. Unlike the Australian program[17], no objective measure of falling competence was used. Fourth, the qualitative data consisted of brief written responses collected as part of a course-evaluation questionnaire rather than interviews or focus groups. Although the responses were analysed systematically, no follow-up probing or member checking was possible; the qualitative findings should therefore be regarded as exploratory. Fifth, the questionnaire did not record judo

dan grade, years of teaching experience, or previous experience of instructing older adults, preventing analysis of how these factors influenced perceived feasibility. Sixth, items concerning the on-demand lectures and willingness to serve as a future course tutor were available only to 93 respondents. Finally, the AJJF does not yet systematically track classes subsequently delivered by certified instructors, so implementation reach and sustainment could not be evaluated.

Future research should prospectively follow certified instructors to determine whether and how they implement programs in community settings. A registry of classes delivered by certified instructors could provide data on implementation reach, sustainment, adverse events, and the types of settings in which programs are delivered. Prospective studies should also evaluate instructor competence using objective skill measures and assess delivery fidelity. Ultimately, studies involving older adults are required to determine whether programs delivered by certified instructors improve safe falling skills, physical function, fear of falling, or fall-related injury outcomes.

Conclusions

A short, nationally delivered instructor training course for judo-based fall injury prevention was highly acceptable, but high acceptability did not necessarily translate into perceived readiness for community implementation. Certification should therefore be supplemented by supervised practical experience, objective decision tools for participant screening, practical implementation resources, and structured post-certification support. Prospective studies are needed to evaluate instructor competence, actual implementation, safety, and outcomes in older adults.

Ethics approval

The study protocol was approved by the Ethics Committee of Tokai Gakuen University (approval number: 2025-26) and was conducted in accordance with the Declaration of Helsinki.

Consent to participate

All participants were informed of the study purpose, voluntary nature of participation, anonymity, and publication of aggregated results. Because the questionnaire was anonymous, submission of the online questionnaire was regarded as consent to participate.

Authors' contributions

Akira Ikumi: Conceptualization, Methodology, Investigation, Formal analysis, Writing – original draft, Writing – review & editing, Project administration. Naoki Sakuyama: Conceptualization, Methodology, Formal analysis, Writing – review & editing. Ryota Yamada: Investigation. Heiki Kunimoto: Investigation. Keisuke Nakajima: Investigation. Masaomi Miura: Investigation. Nikos G. Malliaropoulos: Writing – review & editing. Takeshi Kamitani: Conceptualization, Funding acquisition, Supervision. All authors read and approved the final version of the manuscript.

Funding

This work was supported by JSPS KAKENHI Grant Number 26K14205. The funding source had no role in the study design; data collection, analysis, or interpretation; preparation of the manuscript; or the decision to submit the manuscript for publication.

Acknowledgments

The authors thank the All Japan Judo Federation, the Medical Science Committee, and the Fall Injury Prevention Special Committee for their support in organizing the instructor training course. The authors also thank all course participants who completed the questionnaire.

During the preparation of this work, the authors used ChatGPT (OpenAI) for language editing and assistance with drafting and revising the manuscript. All output was subsequently reviewed, corrected, and where necessary rewritten by the authors, and the manuscript was checked for the accuracy of clinical and scientific terminology by the author group. The authors take full responsibility for the content of the published article.

References

1. Vaishya R, Vaish A. Falls in older adults are serious. Indian J Orthop. 2020;54(1):69-74.
2. World Health Organization. WHO Global Report on Falls Prevention in Older Age. World Health Organization; 2007.
3. Montero-Odasso M, van der Velde N, Martin FC, et al. World guidelines for falls prevention and management for older adults: a global initiative. Age Ageing. 2022;51(9):afac205.
4. Sherrington C, Fairhall NJ, Wallbank GK, et al. Exercise for preventing falls in older people living in the community. Cochrane Database Syst Rev. 2019;1(1):CD012424.
5. Callan M, Bird C, Bradic S, Campos Mesa MC, del Castillo Andrés O, Sori Doval M, et al. Global consensus statement: how can judo contribute to reducing the problem of injurious falls in older adults? The Arts and Sciences of Judo. 2024;4(1):14-27.
6. Singh K, Malliaropoulos N, Callan M, Kamitani T, Ikumi A, Sakuyama N, et al. Judo-based falls training in older adults: an Olympic fighting art is not just a way to win medals. Clin J Sport Med. Published online June 25, 2026.
7. Groen BE, Smulders E, de Kam D, Duysens J, Weerdesteyn V. Martial arts fall training to prevent hip fractures in the elderly. Osteoporos Int. 2010;21(2):215-221.
8. Chan U, Ayliffe L, Visvanathan R, Headland M, Verma M, Jadczak AD. Judo-based exercise programs to improve health outcomes in middle-aged and older adults with no judo experience: a scoping review. Geriatr Gerontol Int. 2023;23(3):163-178.
9. Palumbo F, Ciaccioni S, Guidotti F, Forte R, Sacripanti A, Capranica L, et al. Risks and benefits of judo training for middle-aged and older people: a systematic review. Sports (Basel). 2023;11(3):68.
10. Valdés-Badilla P, Ramirez-Campillo R, Herrera-Valenzuela T, et al.

Effectiveness of Olympic combat sports on balance, fall risk or falls in older adults: a systematic review. Biology (Basel). 2022;11(1):74.
11. Arkkukangas M, Strömqvist Bååthe K, Hamilton J, Ekholm A, Tonkonogi M. Feasibility of a novel Judo4Balance - fall preventive exercise programme targeting community-dwelling older adults. J Frailty Sarcopenia Falls. 2020;5(3):47-52.
12. Jadczak AD, Verma M, Headland M, Tucker G, Visvanathan R. A judo-based exercise program to reduce falls and frailty risk in community-dwelling older adults: a feasibility study. J Frailty Aging. 2024;13(1):1-9.
13. Sakuyama N, Kamitani T, Ikumi A, Kida M, Kaneshiro Y, Akiyama K. Assessment of the efficacy and safety of a Judo exercise program in improving the quality of life among elderly patients. J Rural Med. 2021;16(4):229-235.
14. Ciaccioni S, Guidotti F, Palumbo F, Forte R, Galea E, Sacripanti A, et al. Judo for older adults: the coaches knowledge and needs of education. Front Sports Act Living. 2024;6:1375814.
15. Arkkukangas M, Stromqvist Baathe K, Hamilton J, Hassan A, Tonkonogi M. FallFitness exercise program provided using the train-the-trainer approach for community-dwelling older adults: a randomized controlled trial. BMC Geriatr. 2024;24(1):983.
16. Liljeroos M, Stromqvist Baathe K, Tonkonogi M, Arkkukangas M. Educated peers experiences and perceptions of the group-based FallFitness exercise programme for older adults. Age Ageing. 2025;54(8):afaf218.
17. Jadczak AD, Verma M, Headland M, Visvanathan R. Upskilling allied health professionals and judo coaches to teach safe falling skills to older adults: a train-the-trainer intervention. Australas J Ageing. 2026;45(3):e70221.
18. Sibley KM, Tittlemier B, Olarinde F, Leadbetter BK, Bouchard DR. Factors influencing older adult community fall prevention exercise implementation: a scoping review. Age Ageing. 2024;53(8):afae186.
19. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. Int J Qual Health Care. 2007;19(6):349-357.
20. Elo S, Kyngas H. The qualitative content analysis process. J Adv Nurs. 2008;62(1):107-115.
21. Lota KS, Malliaropoulos N, Blach W, Kamitani T, Ikumi A, Korakakis V, et al. Rotational head acceleration and traumatic brain injury in combat sports: a systematic review. Br Med Bull. 2022;141:33-46.

Item	n	Median [IQR]	Mean ± SD	Positive response, n (%)	1, n (%)	2, n (%)	3, n (%)	4, n (%)	5, n (%)
On-demand lecture time	93	3 [3–3]	2.97 ± 0.45	4 (4.3)	2 (2.2)	4 (4.3)	83 (89.2)	3 (3.2)	1 (1.1)
On-demand lecture content	93	5 [4–5]	4.43 ± 0.76	83 (89.2)	1 (1.1)	0 (0.0)	9 (9.7)	31 (33.3)	52 (55.9)
Face-to-face lecture time	151	3 [3–3]	2.90 ± 0.57	5 (3.3)	7 (4.6)	9 (6.0)	130 (86.1)	2 (1.3)	3 (2.0)
Face-to-face lecture content	151	5 [4–5]	4.48 ± 0.67	138 (91.4)	0 (0.0)	1 (0.7)	12 (7.9)	51 (33.8)	87 (57.6)
Role-playing time	151	3 [3–3]	2.97 ± 0.54	10 (6.6)	4 (2.6)	9 (6.0)	128 (84.8)	7 (4.6)	3 (2.0)
Role-playing content	151	5 [4–5]	4.49 ± 0.66	139 (92.1)	0 (0.0)	1 (0.7)	11 (7.3)	52 (34.4)	87 (57.6)
Staff support during role-playing	151	5 [5–5]	4.83 ± 0.47	145 (96.0)	0 (0.0)	0 (0.0)	6 (4.0)	14 (9.3)	131 (86.8)
Feasibility of community implementation	151	4 [3–5]	3.98 ± 0.96	107 (70.9)	2 (1.3)	8 (5.3)	34 (22.5)	54 (35.8)	53 (35.1)
Test difficulty	151	3 [3–3]	2.87 ± 0.84	24 (15.9)	12 (7.9)	23 (15.2)	92 (60.9)	20 (13.2)	4 (2.6)
Overall satisfaction	151	5 [4–5]	4.70 ± 0.53	146 (96.7)	0 (0.0)	0 (0.0)	5 (3.3)	35 (23.2)	111 (73.5)
Willingness to recommend the course	151	5 [4–5]	4.42 ± 0.72	133 (88.1)	0 (0.0)	1 (0.7)	17 (11.3)	51 (33.8)	82 (54.3)

A positive response was defined as a score of 4 or 5 on a 5-point Likert scale. For time allocation and test difficulty, higher values do not necessarily indicate a more favourable response.

Supplementary Table 1. Distribution of responses to course evaluation items.

Component	Duration	Format and content
On-demand video lectures	Approx. 90 min (6 videos, 10–15 min each)	Self-paced e-learning; epidemiology and definition of falls, fall-prevention strategies, judo and older adults, medical conditions and medications, functional assessment, exercise programming, safety management
Knowledge confirmation test	30 min	E-learning; 10 multiple-choice questions, pass mark 60%, unlimited re-attempts
Face-to-face lectures	60 min	Delivered by committee members; consolidation of on-demand content and orientation to the day
Role-playing exercises	180 min	Small groups (maximum 6 trainees per facilitator) planning a fall injury prevention class for hypothetical older adults with defined medical histories and functional limitations; program structure, risk assessment, exercise selection, safety management
Group presentations and feedback	60 min	Each group presents its plan; feedback from facilitators and other groups
Certification examination	Administered on the day	Separate from the knowledge confirmation test; same-day re-examination available
Total	Approx. 420 min (7 h)	Of which 300 min face to face
Supervised practical instruction in ukemi on the mat	None scheduled	Role-playing was held in a judo dojo and some groups elected to try breakfall techniques or exercises; trainees' own safe falling skills were not assessed

Durations are as delivered in the standard course format. The curriculum was not modified during the study period.

Supplementary Table 2. Structure, duration and content of the instructor training program.

Section	Content	Pages
Preface	Background and aims of the program	4
Chapter 1	Fundamentals of fall prevention: epidemiology of fall-related disability; fall prevention and healthy life expectancy; definition of a fall; terminology; fall risk; exercise for fall prevention; international fall prevention; summary	5–11
Chapter 2	Older adults and judo: effects on physical, mental and social health; effects on fall and injury prevention (Yawara-chan Taiso; JUDO 4 Balance; Care-Free Fall Prevention Project)	12–15
Chapter 3	Factors that increase fall risk: diseases associated with falls (cardiac disease, diabetes mellitus, Parkinson disease, locomotive syndrome, rheumatoid arthritis); medications that increase fall risk (hypnotics, antiplatelets and anticoagulants, corticosteroids)	16–19
Chapter 4	Fall risk and functional assessment: criteria for stopping exercise; fall risk assessment (one-leg standing time, Timed Up and Go test, Functional Reach Test, chair-stand test); fall risk during assessment; timing of assessment	20–26
Column 1	How to make exercise in later life enjoyable	27–28
Chapter 5	Content of the exercise program: structure of the exercise program; example programs; advanced program examples	29–33
Column 2	Safe falling for seniors	34
Chapter 6	Application of judo-based fall injury prevention exercise (I): setting the target group; time schedule and specific content; the need for lectures; physical risk assessment; exercise program and content; participant questionnaire	35–41
Chapter 7	Application of judo-based fall injury prevention exercise (II): assessment in practice; initial evaluation; environmental adjustment; periodic evaluation; appendix	42–48
Appendix	Ensuring the safety of judo-based fall injury prevention exercise, emergency response and accident reporting: environmental preparation; emergency care arrangements; insurance; response and reporting after an incident; follow-up; model accident report form	49–53
	List of authors	54

The training manual, "Fall Injury Prevention Instructor Training Textbook: for the practice of fall prevention through judo" (All Japan Judo Federation, 2024), comprises 56 pages. The Japanese original is available from the All Japan Judo Federation on request.

Supplementary Table 3. English translation of the table of contents of the training manual.