



Study Protocol

Evaluation of an Arnis-based Exercise Program for Community-Dwelling Older Adults in the Philippines: An Exploratory Study Protocol

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Abstract

Background: Arnis is the national martial art of the Philippines. Similar to Tai Chi, a martial art with established therapeutic effects, it can improve the balance control of older adults. However, no study has been conducted to prove this. **Objective:** This study aims to design and evaluate an Arnis-based exercise program to improve the static and dynamic balance control of community-dwelling Filipino older adults. **Methodology:** A qualitative exploratory study will be conducted. An Arnis-based exercise program for older adults will be age-appropriately designed and video-recorded by the researchers. A heterogeneous group of resource persons composed of a Physical Therapist, Geriatrician, Sports Scientist, Arnis Expert, and Senior Citizen will be invited to watch the videos and evaluate the exercise program. Using the Delphi method and semi-structured interviews via the different online meeting platforms, they will provide feedback and comments about the exercise program based on their unique professional background, experience, and perspective. Thematic analysis will be employed in examining the gathered information. The modification of the exercise program and additional rounds of validation and feedback from the resource persons will be conducted as necessary until consensus is achieved. **Expected Results:** This will produce an alternative and culturally relevant exercise program that can be implemented by physical therapists and other health professionals caring for older adults in improving their balance control to reduce their risk of falling.

Key Words: Arnis, Balance, Exercise, Filipino, Older Adults

INTRODUCTION

Aging is accompanied by the deterioration of various functional systems that maintain static and dynamic balance control in older adults.¹ Balance control pertains to the ability of an individual to maintain a stable position and proper orientation with the center of mass is kept within the base of support. Static balance control is when the body is at rest, while dynamic balance control is evident when the body is in motion.² The systems that maintain the body's static and dynamic balance control deteriorate in old age, which increases the risk of falling and reduces the ability to live

independently among older adults.¹ In the Philippines, 19% of the older adult population experienced an average of 1.7 falls in 2019. Among these falls, 15% reported injuries that required medical attention.³ Balance problems are the common causes why older adults call for medical treatment.⁴ Therefore, interventions to improve balance are necessary to prevent and reduce the risk of falling in older adults. Interventions such as Martial arts are beneficial in addressing the risk of falling among older adults.⁴⁻⁸

Martial arts are different codified combat systems that originated in the Far East and are considered a way of promoting discipline and greater values in Asia.⁵ Thai boxing, Tai Chi, and Dao De Xin showed significant improvements in static and dynamic balance in community-dwelling older adults.⁶⁻⁸ Hence, these studies prove that martial arts could be effective interventions in addressing the balance problems among older adults. In the Philippines, the enactment of Republic Act 9850 declared Arnis as the National Martial Art and Sport of the country.⁹ Arnis, also known as Kali or Eskrima, is an indigenous Filipino martial art that uses swinging and twirling of arm movements like striking, thrusting, and parrying techniques for defense and offense to develop skill, accuracy, agility, and speed of its practitioners.⁹ Arnis training focuses on flexibility, strength, and endurance. Similarly, this provides a full-body workout that can help improve stamina, muscle tone, flexibility, strength, and balance control. This can also enhance posture and concentration that is beneficial in strengthening core muscles for a more stable and effective lower extremity movement.¹⁰

Utilizing the techniques and movements of Arnis in designing an exercise program to address balance problems in the geriatric population can be considered as an integration of the country's cultural influences in geriatric rehabilitation. It has been reported that the older population from diverse cultural backgrounds often prefers programs that are culture-specific and historically relevant.¹¹ In the geriatric population, administration of culturally relatable exercises such as martial arts could generate increased participation and interest. For instance, older adults who are Chinese prefer Tai Chi due to its familiarity and cultural significance.¹²

Similar to Tai chi, which has been proven to effectively improve balance control and reduce the risk of falling in older adults, Arnis also has the potential to improve both static and dynamic balance control in older adults because of its unique techniques and movements. However, no literature exists about the use of Filipino Martial Arts such as Arnis, Kali, or Eskrima as a balance-oriented program among community-dwelling adults. Therefore, this research aims to design

and evaluate an Arnis-based exercise program in improving the static and dynamic balance control of community-dwelling Filipino older adults. Physical therapists and other health professionals working with geriatric patients could use the said exercise program. This could engage them in structured community-based physical activities that could improve their static and dynamic balance control and lower their risk of falling without the need to visit an expensive facility or use specialized equipment.¹³

METHODS

Study Design. This qualitative study will utilize an Exploratory Delphi Method through semi-structured interviews to obtain the collective opinions and feedback from a panel of resource persons about the Arnis-based exercise program.¹⁴ This method is used for facilitating and structuring conversation among a panel of experts while maintaining anonymity to transform individual opinions into group consensus.¹⁵⁻¹⁶ This study protocol was registered to the Philippine Health Research Registry with a registry number: PHRR210226-003278. The Consolidated criteria for Reporting Qualitative research (COREQ) Checklist¹⁷ was used in drafting this study protocol (Supplement A).

Ethical Considerations. This study was reviewed and approved by the University of Santo Tomas (UST) - College of Rehabilitation Sciences Ethics Review Committee (protocol number SI-2020-024R1). This study will comply with the Declaration of Helsinki Principles, Ethical Guidelines on Health-Related Social Research of the Philippine Health Research Ethics Board, and the Data Privacy Act 2012 of the Philippines. The resource persons' views and opinions will only be obtained upon completion of the informed consent forms.

Participants. A heterogeneous group of five resource persons will be recruited through expert purposive sampling.¹⁸ The selection and identification of known experts will be based on knowledge and purpose rather than representativeness.¹⁹ A smaller sample size is sufficient as the Delphi Method emphasizes expert consensus rather than maximum

variation, which allows for increased inclusion and participation from the resource persons.¹⁹

The resource persons, composed of one Physical Therapist, one Geriatrician, one Sports Scientist,

one Arnis Expert, and one Senior Citizen, are considered stakeholders in geriatric rehabilitation. The description and eligibility criteria for these resource persons are further illustrated in Table 1.

Table 1. Recruitment criteria for the resource persons of the study.

Resource Persons	Qualifications
Physical Therapist	<ul style="list-style-type: none"> • Definition: An allied health professional, also known as movement expert, who improves quality of life through exercise, hands-on care, and patient education. • Licensed in the Philippines or Abroad • With at least one year of experience • Role: To determine if the designed Arnis-based exercise program could be utilized as an intervention to address decline in static and dynamic balance control in older adults.
Geriatrician	<ul style="list-style-type: none"> • Definition: A primary care physician who has received additional training in the treatment of geriatric patients. • A Licensed Medical Doctor Specializing in Geriatric Care (Geriatrician) • With at least one year of experience • Role: To determine if the designed Arnis-based exercise program can be used as a safe and effective intervention to improve balance control among older adults.
Sports Scientist	<ul style="list-style-type: none"> • Definition: An allied health professional that provides expert advice and support to athletes and coaches to help them understand and enhance sports performance. • With at least one year of experience • Role: To determine if the designed Arnis-based exercise program is age-appropriately performed for older adults.
Arnis Expert	<ul style="list-style-type: none"> • Definition: An Arnisador or Arnisadora who actively engages or practices the local martial art of Arnis. • A member or an officer of any legitimate Arnis Federations or a Certified Arnis Practitioner in the Philippines • With at least one year of experience • Role: To determine if the designed Arnis-based exercise program follows the correct form and technique of the martial art.
Senior Citizen	<ul style="list-style-type: none"> • A Filipino older adult who is at least 60 years of age • Role: To determine if the designed Arnis-based exercise program is suitable and acceptable to fellow older adults.

The resource persons must all be proficient in speaking and understanding English and Filipino and must be technologically proficient. Technologically proficient is defined as being able to operate a personal computer for video conferencing and video playback.

Setting. Due to the restrictions imposed by the COVID-19 pandemic, the study will be conducted online. The researchers will utilize various online meeting platforms such as e-mail, Zoom, or Google Meet to communicate with the resource persons and conduct interviews.

Design and Videorecording of the Exercise Program. The Arnis-based exercise program will be designed and developed by: 1) a licensed physical therapist, 2) an Arnis instructor, and 3) a fitness expert, who are also co-investigators in

this study. The exercise program will be adapted based on the Frequency, Intensity, Time, and Type (FITT) formula. Based on the literature review, an exercise frequency of three times a week for 12 weeks is recommended to improve balance in older persons.²⁰⁻²¹ The exercise intensity will be progressively increased every four weeks in three phases. During Phase 1 or weeks 1-4, the exercise intensity is low to allow the participants to master the basic techniques of Arnis. During Phase 2, weeks 5-8, the intensity

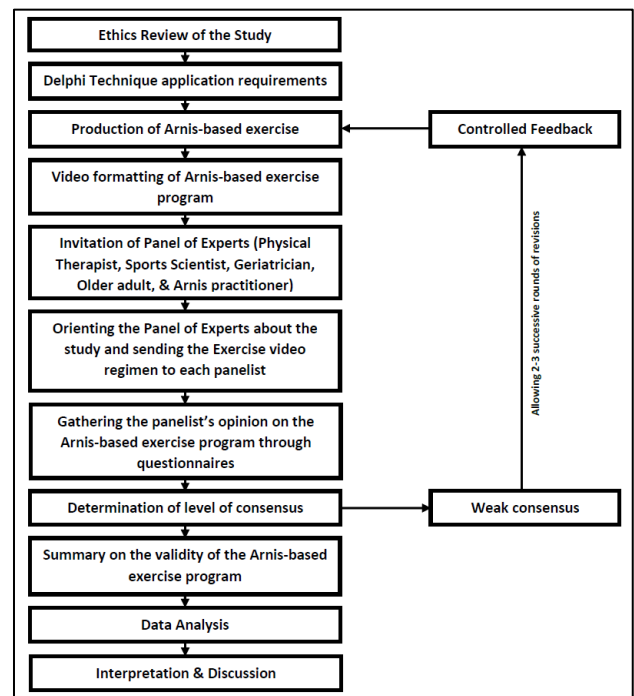
will be transitioning from low to moderate to allow more challenging movements to be incorporated into the routine. During Phase 3, weeks 9-12, the intensity will be moderate to sufficiently induce improvement in the balance control of older adults. Borg's Rate of Perceived Exertion (RPE) Scale 6-20 will be used as a guide in assessing exercise intensity. Each routine will be performed for 8 to 12 repetitions for 2-5 sets. The exercise time will be 40 minutes per session—5 minutes of warm-up, 30 minutes exercise proper, and five minutes of cool-down.²²⁻²⁴ The exercise type will involve rhythmic activities following the techniques and movements inherent to Arnis.⁶⁻⁷

The researchers will video-record the exercise program. They will participate first in Arnis workshops conducted by an Arnis Instructor from UST Institute of Physical Education and Athletics (IPEA) to ensure proper demonstration and performance prior to filming. The 12-week exercise program will be shot in multiple short videos to present the weekly routines separately and secure sequentially manageable files for ease of validation by the resource persons. Two assigned student-researchers (one male and one female) will prepare the videos using the Filipino and English languages with proper captions as visual cues. The recorded videos will be presented to the Arnis instructor, fitness instructor, and principal author for checking. Video modifications and editing will be undertaken as deemed necessary based on their feedback until it reaches the approval phase for presentation to the resource persons.

Data Gathering Procedure. The researchers will coordinate with the UST IPEA, UST Simbahayan, UST Hospital, and UST College of Rehabilitation Sciences to obtain a list of possible resource persons to invite and complete the panel of experts. Before the commencement of the study, the researchers will make sure that the interviewer and resource persons have no established relationship. Only the interviewer's profession and years of experience will be reported to the resource persons. The identified resource persons will receive an email invitation to join the study. After accepting the invitation, they will then be instructed to sign a consent form and a non-disclosure statement form before implementation. Afterward, the resource

persons will be given access to the protected Google Drive repository of all the documents and video files of the Arnis-based exercise program. They will be instructed to examine the files, watch the video, and evaluate the exercise program within two weeks. An online semi-structured interview will then be scheduled for each resource person as a key informant. Only the interviewer and key informant will be present in the interview. This is conducted individually for each key informant to avoid cross-influence of their responses.

Figure 1. Data Gathering Procedure (Delphi Method Technique)



The principal author, who is a male physical therapist with a Doctor of Philosophy degree and a faculty researcher with 20 years of experience, will conduct the semi-structured interview. He will be assisted by two 4th-year female physical therapy student authors--SAF and MTT--who completed the training on the principles of health research ethics and good research practice. A set of general questions and specific questions (Supplement B), tailored to each resource person and validated by a methodological research expert, will be used during the interview. These questions were based on the phenomenological studies, which discussed the relationship between community-dwelling older adults and falls and its relation to

balance.^{13,25} The interviews will be conducted in English and/or Filipino language/s medium and will be recorded audio-visually for transcription and data collection ease. A copy of the transcript will also be sent to each resource person for member checking.

The data gathering process will occur in multiple succeeding rounds dependent on the experts' consensus, which will be determined by analyzing their responses. In the case of a weak consensus, a subsequent round will be held, in which an updated version of the videos will be presented and assessed once more. A strong consensus will forgo a succeeding round.

Data Analysis. Transcribed data from the interviews will be analyzed using thematic analysis as the study's methodological orientation using the NVivo 12 Plus program. These data will then be coded by three designated researchers and analyzed side by side to identify common categories and themes. More than one person on the team will analyze the responses to ensure consistency and accuracy in the analysis process. The result of the encoding and analysis will then be sent back to the resource persons for double-checking if the researchers correctly interpreted their responses. Once done, a strong or weak consensus will be decided from the analyses. A strong consensus will be determined by the agreement of three out of the five experts based on their responses to the general questions. A weak consensus would be evident if less than three of the five resource persons showed agreement in their responses. The researchers will change the exercise program if suggestions were made or if the consensus was relatively weak for its validity. Each round of data gathering will be followed by a round of data analysis and modification; then, the modified regimen will be presented again to the resource persons for another round of data gathering. The researchers may go through multiple cycles of the same process until a strong consensus is reached.

EXPECTED RESULTS

This study will produce an exercise regimen for the geriatric population that is based on the

techniques and movement of Arnis. This only focuses on the design and development of the exercise program evaluated by identified stakeholders in geriatric rehabilitation, not on its effectiveness for balance improvement, which will be determined by experimental studies. By establishing an Arnis-based exercise program, this will be significant in providing an alternative intervention to address the decline in balance control and to reduce the risk of falling among older Filipino individuals while promoting the Filipino culture all at the same time.

Individual author's contributions

D.L.; Conceptualized the study design and methods, supervised manuscript revisions. J.P. and R.L.; Involved in exercise program formulation and revisions; suggested modifications in the study's methodologies. D.E.A.; Distributed the tasks, led submissions; co-wrote the protocol, and performed manuscript revisions. D.E.A., J.B., E.J.C., S.A.F., J.J.L., D.K.R., K.S., and M.T.T.; Co-wrote the protocol and completed manuscript revisions. All read and approved the manuscript's final version.

Disclosure statement

The authors have no relevant financial relationships to disclose.

Conflicts of interest

The author Donald S. Lipardo, PhD is an Associate Editor of the Philippine Journal of Allied Health Sciences (PJAHS). All other authors declare no conflicting interest.

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in editing the language and syntax of the study protocol.

Supplementary Material

[Supplementary Material A. COREQ \(COnsolidated criteria for REporting Qualitative research\) Checklist.](#)

[Supplementary Material B. Semi-structured interview guide questions.](#)

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