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Application of Social Learning Theory in Developing a Pressure Injury Training Program for Nursing Assistants

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Abstract

Pressure injury (PI) represents a major issue in nursing homes across China, largely driven by the country's fast-growing elderly population. Nursing assistants are central to preventing and handling pressure injuries, yet they frequently receive insufficient training. To address this shortfall, a structured training program grounded in social learning theory (SLT) was developed specifically for nursing assistants to strengthen their skills in pressure injury prevention and management. Expert agreement on the program's framework and content was obtained through the modified Delphi technique. A two-round Delphi survey was carried out with a panel of specialists from wound care, community nursing, geriatric nursing, and nursing education. The training program was constructed according to SLT principles, with a strong focus on observational learning, enactive mastery, and behavioral reinforcement. Multiple experts reviewed the program content, which drew upon findings from systematic literature reviews and qualitative stakeholder interviews. Statistical measures used in data analysis included the experts' positive coefficient, authority coefficient (Cr), coordination coefficient (Kendall's W), and coefficient of variation (CV) to assess reliability and consensus.

Agreement was achieved on 79 core indicators for the training program. These consisted of 4 first-level indicators (training objectives, content, methods, and evaluation), 13 second-level indicators, and 62 third-level indicators. The expert authority coefficient reached 0.93. Kendall's W was 0.372 ($P < 0.001$) in the first round and 0.177 ($P < 0.001$) in the second round, demonstrating robust expert consensus. The program incorporates key SLT elements—attention, retention, motor reproduction, and motivation—to maximize training effectiveness. This study established a detailed SLT-based training program for pressure injury prevention and management targeted at nursing assistants working in Chinese nursing homes, developed via the modified Delphi method. The program meets the pressing requirement for competency-focused education in this area. Subsequent studies should examine the real-world application and outcomes of this program to assess its impact on enhancing nursing assistants' capabilities and lowering pressure injury rates among elderly residents.

Keywords: Social learning theory, Pressure injury, Training, Nursing assistants

Introduction

Pressure injury/injuries (PI/PIs), commonly known as bedsores, decubitus ulcers, pressure ulcers, or pressure sores, refer to localized tissue damage resulting from sustained pressure or pressure combined with shear forces on the skin and/or underlying structures [1]. PIs rank among the most common, expensive, yet largely avoidable complications in healthcare settings and pose a particular risk to older adults [2]. They are well documented in nursing home environments [3]. In China, the elderly population is growing rapidly, increasing the need for long-term care services. By 2020, over 254 million people in China were aged 60 years or older, accounting for 18.1% of the total population [4]. This shift highlights the pressing demand for effective pressure injury prevention and management (PIPM)

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approaches in nursing homes [5]. Research indicates that the prevalence of PIs in nursing homes worldwide ranges from 3.4% to 32.4% [6], while incidence rates across countries have been reported between 3.6% and 39.4% [7]. In Chinese nursing homes, prevalence has been documented at 1.91%–10.4% and incidence at 28.9% [8, 9]. Pressure injuries impose a heavy burden on both affected individuals and the broader healthcare system [10].

Nursing assistants form the main caregiving workforce in nursing homes and serve as key frontline staff who spend considerable time monitoring and supporting long-term care residents [11]. As a result, they have a critical role in pressure injury prevention and management (PIPM). Nursing homes require competent nursing assistants who possess appropriate attitudes, solid knowledge, and necessary skills to provide quality care and improve residents' quality of life [12]. Bangova noted that limited knowledge or incorrect care practices among nursing assistants can contribute to higher pressure injury rates [13]. Because of gaps in their knowledge and skills, many nursing assistants tend to begin preventive measures only after a pressure injury has already appeared, misuse prevention products, or apply unsuitable pressure injury prevention and management techniques [14]. Although clinical guidelines exist and include essential information for identifying early skin breakdown, this content is seldom included in training for nursing assistants, the staff most likely to notice these signs [14]. In a study by Lavallée *et al*. [15], interviews with nursing home personnel revealed that lack of knowledge is a significant obstacle to effective pressure injury prevention [15].

Nursing assistants require a modern, well-designed training initiative to develop the competencies needed for their daily responsibilities and to effectively translate knowledge into practice [16]. Evidence from around the world has repeatedly demonstrated that structured training helps nursing assistants strengthen their skills in pressure injury prevention and management (PIPM), deepen their understanding of related conditions, improve their professional attitudes, and contribute to superior care and better health outcomes for elderly residents in nursing homes [17]. In 2019, China's National Health Commission released a policy calling for enhanced training and standardized oversight of nursing assistants. The directive stressed that healthcare facilities must assign only properly trained and certified nursing assistants to relevant tasks and must actively deliver training in line with official curriculum guidelines [18].

Despite this, most current pressure injury (PI) training initiatives primarily serve nurses, patients, or family members, and the overall quality of these programs differs widely across countries [19, 20]. High-quality PI training programs specifically created for nursing assistants employed in nursing homes remain scarce worldwide, especially those focused on building core competencies. For example, the United Kingdom lacks any nationwide educational scheme for nursing assistants that targets skin assessment or PI prevention techniques [21]. In the United States, Wogamon [14] introduced a PI training course for nursing assistants in one nursing home. Still, the content was limited to basic topics such as causes, risk factors, staging, repositioning, documentation, and reporting, all drawn from the outdated 2011 NPUAP/EPUAP guideline. Moreover, the entire session lasted only 2 hours and consisted solely of lectures. In Sweden, Hultin *et al*. [22] delivered training to nursing assistants in an elderly care setting to improve their PIPM abilities, focusing mainly on the application of a pressure mapping device and using the outdated 2014 NPUAP/EPUAP guideline. The format consisted of just 15 minutes of instruction and one week of independent practice. Importantly, none of these existing programs was built upon any established theoretical foundation. In addition, a systematic review of 24 comprehensive PI prevention initiatives found that 20 occurred in acute care environments and only 4 in long-term care facilities [23], with the majority of participants being general nursing personnel rather than nursing assistants. Given these gaps, there is a clear and pressing need to design a thorough, evidence-based, theory-driven training program that incorporates innovative teaching methods for nursing assistants in PI prevention and management.

Social learning theory (SLT) was first proposed by Albert Bandura in 1977 and has since been extensively used as a guiding framework in public health training programs to boost the capabilities of healthcare workers [24]. When applied to medical education, SLT can improve learning behaviors and help overcome typical challenges in clinical instruction by promoting observation and modeling among participants [25]. Many conventional teaching approaches fall short in delivering the interactive and observational experiences that nursing assistants need to properly absorb and apply vital PIPM knowledge [26]. An SLT-based model provides a useful structure to address this shortcoming. SLT explains how people acquire new behaviors by observing others and

how learning unfolds within social environments [27]. Key elements of the theory include self-efficacy, knowledge acquisition, and skill development. Integrating SLT into nursing education enables trainers to create an engaging, productive environment that better prepares healthcare professionals for real-world demands [28]. Within SLT, nursing assistants primarily learn by watching, copying, and modeling the actions of experienced practitioners. This process is shaped by four main components: attention (such as concentrating during online or in-person sessions), retention (for example, through quizzes and repeated practice), motor reproduction (such as performing tasks with constructive feedback), and motivation (including rewards like positive reinforcement, lighter workloads, higher pay, or improved working conditions) [29]. SLT also aligns with classic behaviorist principles, which emphasize the value of repeated practice and the use of positive or negative reinforcement to encourage desired behaviors [30]. The modified Delphi method offers a systematic, step-by-step approach in which experts collaborate to reach agreement, making it a reliable tool for creating a training program that precisely matches the requirements of nursing assistants. It generally consists of several rounds of questionnaires that allow experts to adjust their views until a collective consensus is achieved [31].

The purpose of this study is to develop a detailed PI training program grounded in Social Learning Theory for nursing assistants working in Chinese nursing homes, using the modified Delphi method. The work is expected to support broader efforts to upgrade geriatric care and safeguard the health and quality of life of China's growing elderly population. Beyond its immediate benefits for nursing homes in China, the study also has important implications for advancing nursing practices and shaping international health policies.

Materials and Methods

Study design

A modified two-round Delphi approach was adopted to build consensus among a group of specialists who had considerable expertise in pressure injury prevention and management (PIPM). The core concept of the Delphi technique involves converting qualitative expert judgments of available evidence into measurable quantitative assessments [32, 33]. The creation of the Social Learning Theory-based training (SLTbT) program for pressure injury prevention was structured in two distinct phases: first, building an initial draft through systematic literature reviews and qualitative investigations; second, conducting expert panel evaluation using the Delphi method to confirm content validity and produce the finalized version of the SLTbT program. All activities were completed between July and August 2024. The full development pathway is presented in **Figure 1**. After clearly defining the research problem, the study team assembled the preliminary draft of the SLTbT program using insights obtained from systematic reviews, focus group discussions, and detailed individual interviews. This initial version then underwent content validation through structured expert panel feedback via the Delphi technique to reach agreement among designated specialists and finalize all program elements. Revisions were made to the training program based on the suggestions and comments gathered during the expert review process, resulting in the completed SLTbT program. One advantage of the Delphi method is that it does not require experts to gather in person; instead, all interaction with the research team occurs via email. This format preserves anonymity and confidentiality while allowing each expert to share opinions without external pressure or group influence [33, 34]. The process relies on sequential questionnaires to collect and refine group opinions until a stable consensus emerges [35].

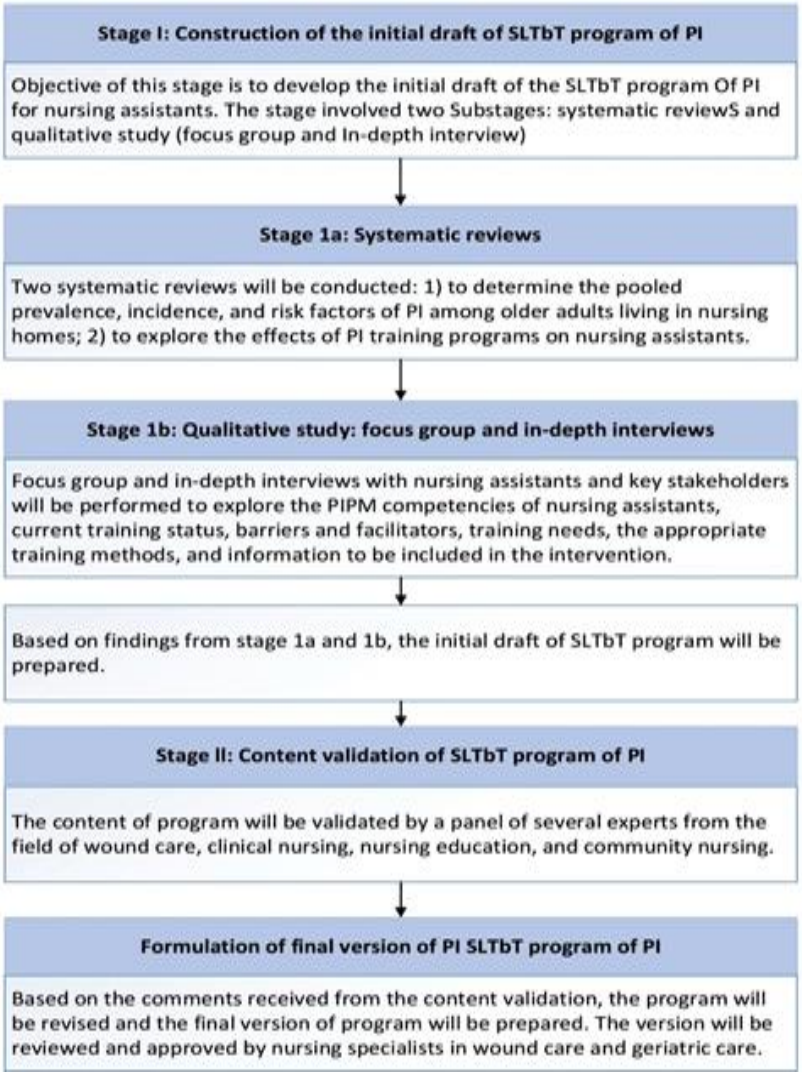

Figure 1. Process of program development.

Delphi method process

The research team developed the first version of the SLTbT program, comprising 78 indicator items drawn from the findings of the systematic review and qualitative study. Then it advanced it through the modified Delphi process.

Panel member recruitment and data collection

A panel of subject-matter experts was formed and asked to judge the suitability and practicality of the various components of the SLTbT program using a two-round Delphi approach. Between July and August 2024, invitations were sent to 15 experts through email or WeChat to join the study. Experts were given 2 weeks to complete each questionnaire and return it to the researcher. Purposeful sampling guided participant selection. To be included, experts had to meet these conditions: (1) be employed in hospitals, community healthcare centers, or nursing education institutions and possess considerable knowledge in PIPM; (2) have a minimum of 5 years' experience in wound care or 5 years' experience in nursing education; (3) hold at least an associate senior professional title; (4) demonstrate substantial research background in pressure injury and elderly care; (5) possess at least a bachelor's degree. Those who fulfilled all criteria received invitations to join the panel via email or WeChat [34]. Experts unwilling to take part or lacking interest in the topic were not included. Delphi panels generally consist of 10 to 15 members [36].

Consultation questionnaire

The SLTbT program was structured as a structured consultation questionnaire divided into three main sections: an introductory part, details about the experts, and an evaluation of the suitability of the PI training program. The starting version included 78 indicator items in total: 4 first-level indicators spanning 4 domains (training objectives, training contents, training methods, training evaluation), 13 second-level indicators (three under training objectives, two under training contents, three under training methods, and five under training evaluation), and 61 third-level indicators (27 for training objectives, 21 for training contents, eight for training methods, and five for training evaluation). Each indicator's appropriateness was scored on a 5-point Likert scale ranging from 1 ("not at all appropriate") to 5 ("very appropriate"). Experts were also given a separate space to suggest any additions, deletions, or changes to the items. Expert consensus on each indicator was measured by examining the mean score and the coefficient of variation (CV) of these appropriateness ratings [37].

Delphi round 1

The researcher distributed the original questionnaires to each expert via email or WeChat and collected their completed responses within 2 weeks. Following this, all feedback was collected, summarized, and carefully examined. Items that met the preset consensus standards remained in the program, while the agreed-upon items, along with any modifications suggested by the experts, were prepared for the next stage.

Delphi round 2

During the second round, experts reevaluated and scored their agreement with every remaining item. The entire consultation ended once the panel achieved overall consensus after these two rounds of Delphi iterations.

Data analysis

Data processing and statistical analysis were performed using Microsoft Excel 2010 and IBM SPSS Statistics 20.0. Basic demographic details of the panel members were summarized using descriptive statistics. The overall quality and soundness of the Delphi approach were evaluated using three main measures: the experts' positive coefficient, authority coefficient, and coordination coefficient [33].

• The experts' positive coefficient shows how engaged the panel members were with the project and is measured by the questionnaire return rate [38]. A return rate above 70% was interpreted as evidence of considerable interest in the research.

• The experts' authority coefficient (Cr) reflects the trustworthiness of the gathered opinions [37]. It was determined by combining expert judgment (Ca) and familiarity with the subject matter (Cs) through the formula (Ca + Cs)/2. Reliability was considered acceptable when Cr reached 0.70 or above [39, 40]. Ca drew upon theoretical reasoning, hands-on practice, insights from both local and international publications, and personal intuition. The weighting for these bases was set as: theoretical analysis (0.3, 0.2, 0.1), practical experience (0.5, 0.4, 0.3), knowledge drawn from domestic and foreign sources (0.1, 0.1, 0.05), and intuition (0.1, 0.1, 0.05) **(Table 1)**. Familiarity levels (Cs) were rated from "very familiar" down to "very unfamiliar," assigned scores of 1.0, 0.8, 0.6, 0.4, and 0.2, respectively [40, 41].

• The coefficient of variation (CV) served to gauge the extent of agreement in the experts' scoring of individual indicators. Smaller CV figures pointed to greater harmony in their assessments [37]. CV values fall between 0 and 1 and are obtained by dividing the standard deviation by the mean. An indicator was retained if its mean exceeded 4.0 or its CV fell below 0.25 [37].

Table 1. Judgment based on topics for expert consultation.

Criteria for assessing Ca	Basis of judgment (Low)	Basis of judgment (Moderate)	Basis of judgment (High)
Theoretical evaluation	0.1	0.2	0.3
Practical expertise	0.3	0.4	0.5
Evidence from local and international literature	0.05	0.1	0.1
Intuitive judgment	0.05	0.1	0.1

Ethical consideration

Ethical clearance for the study was granted by the institutional review board of Mahidol University, Thailand (IRB number: MUPH 2024–066) and by Jiangsu College of Nursing, China (IRB number: JSCN-ME-2024071801). Every individual took part in the research on a fully voluntary basis.

Results and Discussion

Expert information

Each Delphi round involved 15 experts, 13 of whom were female and 2 male. Participant ages ranged from 35 to 52 years, with an average of 39.87 ± 5.514 years. The group included professionals from tertiary hospitals (n = 8: 6 wound care specialists and 2 geriatric care specialists), community healthcare centers (n = 4), and nursing educational institutions (n = 3). Length of professional service ranged from 9 to 30 years, with a mean of 15.47 ± 7.53 years. Educational qualifications consisted of five bachelor's degrees, eight master's degrees, and two doctoral degrees. Eleven panelists held associate senior titles, and four held senior titles. All possessed solid backgrounds in pressure injury work, with four specializing in community nursing, three in nursing education, and eight in clinical nursing (six wound care specialists and two geriatric care specialists).

Experts' positive coefficient

Questionnaires were sent to all 15 experts in both rounds, achieving a full 100.00% effective response rate. With the positive coefficient well above 70%, the panel displayed strong motivation and interest throughout the study.

Experts' authority coefficient

For this investigation, expert judgment (Ca) was 0.98, familiarity with the topic (Cs) was 0.87, and the combined authority coefficient (Cr) was 0.93. These figures confirmed a very high level of reliability in the results.

Experts' coordination coefficient

Kendall's W coefficient was used to measure the degree of agreement among the experts. In round one, Kendall's W measured 0.372 ($P < 0.001$, $\chi^2 = 429.489$). In round two, it was 0.177 ($P < 0.001$, $\chi^2 = 207.472$). Overall, these outcomes indicated substantial consistency among the experts' viewpoints.

Selection of indicators in the first round

After collecting responses from the initial Delphi round, means, standard deviations, and coefficients of variation (CV) were computed for every indicator. Here, CV values spanned 0.05 to 0.53, and mean scores ranged from 2.00 to 4.93. Three indicators (A117, A123, A124) failed to meet the threshold, showing CVs above 0.25 and means below 4.0; consequently, they were eliminated. Full statistical details appear in **Table 2**. In addition, six experts recommended adjustments to 14 indicators. Following the review, nine indicators were revised, three new indicators were introduced, and two indicators were combined into a single item. These alterations are outlined in **Table 3**.

Table 2. Statistical results of expert consultation for the first round indicators.

Indicator category and items	Coefficient of variation (CV)	Standard deviation (SD)	Mean score
A1: Training goals	0.052338	0.258	4.93
A11: Knowledge-based goals	0.052338	0.258	4.93
A111: Understanding the definition of PI	0.072301	0.352	4.87
A112: Awareness of PI epidemiology and associated risks	0.110238	0.507	4.60
A113: Comprehension of PI pathophysiology	0.184428	0.775	4.20
A114: Knowledge of PI stages and clinical signs	0.141163	0.640	4.53
A115: Recognition of PI risk factors	0.052338	0.258	4.93
A116: Identification of high-risk populations and anatomical sites	0.052338	0.258	4.93
A117: Awareness of PI features in older adults	0.412554*	1.320	3.20*
A118: Familiarity with PI characteristics and causes in nursing home settings	0.096705	0.458	4.73
A119: Knowledge of common PI types and dressing selection	0.205212	0.862	4.20
A1110: Ability to distinguish PI from other wounds (e.g., incontinence-associated dermatitis, diabetic foot ulcers)	0.211289	0.845	4.00
A1111: Understanding types and functions of pressure-relieving devices	0.173049	0.704	4.07
A1112: Knowledge of key nutritional care principles	0.106109	0.516	4.87
A1113: Proficiency in skin care practices	0.072301	0.352	4.87

A1114: Awareness of common PI treatment approaches	0.14374	0.632	4.40
A12: Skill-oriented goals	0.072301	0.352	4.87
A121: Ability to accurately stage PI, especially stage I	0.13226	0.617	4.67
A122: Competency in using the Braden Risk Assessment Tool	0.217307	0.884	4.07
A123: Acquisition of prevention and management skills through observation and imitation	0.327665*	0.961	2.93*
A124: Capability to assess risk and create individualized prevention plans	0.534522*	1.069	2.00*
A125: Mastery of repositioning and transfer techniques to reduce PI risk	0.052338	0.258	4.93
A126: Basic wound care skills	0.217307	0.884	4.07
A13: Attitudinal goals	0.052338	0.258	4.93
A131: Respect and compassion for older adults	0.052338	0.258	4.93
A132: Understanding legal/ethical aspects and protecting residents' rights	0.072301	0.352	4.87
A133: Enhancing confidence and positive attitudes through training	0.072301	0.352	4.87
A134: Promoting teamwork and shared learning	0.052338	0.258	4.93
A135: Maintaining high concern for physical and psychological wellbeing	0.13226	0.617	4.67
A136: Communication skills and psychological care for older adults	0.086258	0.414	4.80
A137: Effective collaboration with nurses	0.125412	0.594	4.73
B1: Training content	0.052338	0.258	4.93
B11: Theoretical module	0.125412	0.594	4.73
B111: Professional ethics and conduct	0.052338	0.258	4.93
B112: Legal and ethical issues in PI care	0.116794	0.561	4.80
B113: PI definition and epidemiology	0.115248	0.507	4.40
B114: Risks associated with PI	0.052338	0.258	4.93
B115: Causes and risk factors	0.072301	0.352	4.87
B116: Staging and clinical features	0.110238	0.507	4.60
B117: PI characteristics in nursing home residents	0.052338	0.258	4.93
B118: Risk assessment methods	0.139129	0.594	4.27
B119: Differentiation from other skin conditions	0.160982	0.676	4.20
B1110: Nutritional care	0.096705	0.458	4.73
B1111: Skin care practices	0.052338	0.258	4.93
B1112: Treatment and management	0.188422	0.816	4.33
B1113: Pressure-relief equipment types	0.217307	0.884	4.07
B1114: Dressing selection	0.188982	0.756	4.00
B1115: Psychological support	0.110238	0.507	4.60
B1116: Communication skills	0.116794	0.561	4.80
B12: Practical module	0.116794	0.561	4.80
B121: Repositioning techniques	0.052338	0.258	4.93
B122: Transfer techniques	0.052338	0.258	4.93
B123: Wound dressing procedures	0.184428	0.775	4.20
B124: PI risk assessment procedures	0.336668*	1.100	3.27*
B125: Use of mobility aids	0.166393	0.743	4.47
C1: Training approaches	0.072301	0.352	4.87
C11: Delivery format	0.116794	0.561	4.80
C111: Online theoretical sessions	0.125412	0.594	4.73
C112: In-person practical sessions	0.052338	0.258	4.93

C12: Instructional strategies	0.072301	0.352	4.87
C121: Attention (video learning + observation + case-based teaching)	0.086258	0.414	4.80
C122: Retention (tests, practice, simulations, peer/cooperative learning)	0.052338	0.258	4.93
C123: Reproduction (knowledge and skill feedback)	0.110238	0.507	4.60
C124: Motivation (encouragement and policy support)	0.141163	0.640	4.53
C13: Training duration	0.141163	0.640	4.53
C131: Online training (videos <10 min; 10–15 sessions over 2 weeks)	0.116794	0.561	4.80
C132: Offline training (2 h demonstration + 3 h practice within 1 week)	0.13749	0.632	4.60
D1: Evaluation framework	0.052338	0.258	4.93
D11: Knowledge assessment	0.052338	0.258	4.93
D111: PI knowledge questionnaire (pre/post)	0.052338	0.258	4.93
D12: Skills assessment	0.052338	0.258	4.93
D121: Practice questionnaire and PI identification tool (pre/post)	0.072301	0.352	4.87
D13: Attitude assessment	0.104561	0.488	4.67
D131: PI attitude questionnaire + self-efficacy scale	0.052338	0.258	4.93
D14: Process evaluation	0.113911	0.516	4.53
D141: Evaluation of online tests and offline practice performance	0.086258	0.414	4.80
D15: Satisfaction assessment	0.052338	0.258	4.93
D151 Post-training satisfaction and feedback evaluation	0.052338	0.258	4.93

Table 3. Summary of modifications from expert consultation in the first round.

Indicator category and items	Expert feedback	Revision decision
First-level indicator		
Newly proposed indicator	One expert recommended that "Training Time" should be classified as a primary-level indicator rather than a subcategory under "Training Methods."	After the team discussion, this suggestion was not adopted.
Second-level indicator	No recommendations were provided by the experts.	No changes made.
Third-level indicators		
1.1.11 Understanding types and functions of pressure-relieving equipment	One expert advised replacing "understand" with "be familiar with."	Accepted and revised accordingly.
1.2.5 Acquiring proper nursing techniques, including repositioning and movement to reduce PI incidence	One expert suggested breaking this into more specific skill components, such as position transfer, turning, and mobility aid use.	Accepted and revised accordingly.
1.2.6 Learning basic wound care techniques	Two experts proposed revising it to "Understand the techniques and procedures for wound dressing changes."	Accepted and revised accordingly.
1.3.6 Familiarity with older adults' characteristics, communication skills, and psychological care	One expert recommended merging this with another item and revising it to emphasize communication with nurses, older adults, and families, as well as psychological support.	Accepted and revised accordingly.
1.3.7 Effective communication with nurses and collaborative problem-solving	—	Incorporated into the revised combined indicator above.
2.1.5 Causes and risk factors of PI	One expert suggested revising to "Mechanisms and risk factors of PI."	Accepted and revised accordingly.
2.1.9 Differentiating PI from other skin conditions	Two experts recommended adding detailed clarification of other common skin conditions.	Accepted and revised accordingly.

2.1.3 Types of pressure-relieving equipment	Two experts suggested modifying to include both "types and functions."	Accepted and revised accordingly.
Newly added indicator	Two experts recommended adding a third-level item under "Theoretical Knowledge Module," addressing "High-risk groups and common anatomical sites for PI."	Accepted and added.
Newly added indicator	One expert suggested adding a third-level item under "Skill Knowledge Module" covering "Selection and application of dressings."	Accepted and added.
3.1.1 Online theoretical training	Two experts recommended including details on how the completion of online videos would be ensured.	Accepted and revised accordingly.
3.3.2 Offline training: 2 h demonstration + 3 h independent practice within 1 week	Two experts suggested providing more detailed scheduling for independent practice.	Accepted and revised accordingly.
4.2.1 Use of Zhou Dongmei's PI Practice Questionnaire and PI identification skills tool for pre/post comparison	One expert recommended separating the two instruments into distinct indicators.	Accepted and revised accordingly.

Selection of indicators in the second round

The research team carefully reviewed the first-round feedback and prepared an updated version of the expert consultation questionnaire for the second round. By the end of this second round, the experts had reached a much higher level of agreement. Every indicator now meets the required appropriateness thresholds, with coefficient of variation (CV) values between 0.05 and 0.20 and mean scores above 4. The complete statistical results for these indicators are presented in **Table 4**. Furthermore, the panel suggested no additions, removals, or alterations to any of the indicators and provided no additional recommendations. In the end, the SLTbT program for PI consisted of 79 indicator items altogether: 4 first-level indicators that covered 4 main domains (training objectives, training contents, training methods, training evaluation), 13 second-level indicators (three under training objectives, two under training contents, three under training methods, and five under training evaluation), plus 62 third-level indicators (25 under training objectives, 22 under training contents, eight under training methods, and seven under training evaluation).

Table 4. Statistical results of the expert consultation for the second-round indicators.

Indicator domains and components	Coefficient of variation (CV)	Standard deviation (SD)	Mean value
A1: Training goals	0.07	0.352	4.87
A11: Knowledge-related goals	0.05	0.258	4.93
A111: Comprehension of PI definition	0.07	0.352	4.87
A112: Knowledge of PI epidemiology and associated risks	0.19	0.828	4.40
A113: Understanding the mechanisms underlying PI	0.18	0.775	4.20
A114: Awareness of PI stages and clinical features	0.14	0.640	4.53
A115: Recognition of PI risk factors	0.20	0.910	4.60
A116: Identification of high-risk populations and body sites	0.17	0.799	4.73
A117: Familiarity with PI characteristics and causes in nursing homes	0.20	0.834	4.13
A118: Knowledge of common PI types and appropriate dressing selection	0.14	0.632	4.60
A119: Ability to distinguish PI from other wounds (e.g., incontinence dermatitis, diabetic foot ulcers)	0.21	0.862	4.20
A1110: Understanding types and functions of pressure-relieving devices	0.21	0.845	4.00
A1111: Awareness of key aspects of nutritional care	0.17	0.704	4.07
A1112: Proficiency in skin care practices	0.13	0.594	4.73

A1113: Understanding common PI treatment approaches	0.13	0.594	4.73
A12: Skill-based goals	0.07	0.352	4.87
A121: Ability to accurately assess PI stages, especially Stage I	0.16	0.743	4.53
A122: Competence in using the Braden Risk Assessment Tool	0.16	0.676	4.20
A123: Learning repositioning techniques	0.18	0.743	4.13
A124: Acquiring patient transfer skills	0.16	0.676	4.20
A125: Ability to guide older adults in using mobility aids	0.13	0.594	4.73
A126: Learning wound dressing procedures	0.22	0.884	4.07
A13: Attitudinal goals	0.12	0.561	4.80
A131: Demonstrating respect and compassion toward older adults	0.17	0.799	4.73
A132: Understanding legal frameworks and protecting residents' rights	0.07	0.352	4.87
A133: Strengthening self-efficacy and positive attitudes through training	0.07	0.352	4.87
A134: Promoting teamwork and knowledge sharing	0.17	0.799	4.73
A135: Maintaining strong concern for physical and mental wellbeing	0.13	0.617	4.67
A136: Mastering communication with nurses, residents, and families while providing psychological support	0.09	0.414	4.80
B1: Training content	0.09	0.414	4.80
B11: Theoretical knowledge module	0.13	0.617	4.67
B111: Professional ethics and conduct standards	0.12	0.561	4.80
B112: Legal and ethical considerations in PI care	0.16	0.724	4.67
B113: Definition and epidemiological profile of PI	0.12	0.507	4.40
B114: Risks and consequences of PI	0.12	0.561	4.80
B115: Mechanisms and risk factors of PI	0.13	0.594	4.73
B116: Stages and clinical presentation of PI	0.11	0.507	4.60
B117: High-risk populations and common anatomical sites	0.05	0.258	4.93
B118: PI characteristics in nursing home residents	0.13	0.561	4.20
B119: Methods for PI risk assessment	0.16	0.676	4.20
B1110: Differentiation from other skin conditions	0.10	0.458	4.73
B1111: Nutritional care practices	0.16	0.737	4.60
B1112: Skin care	0.19	0.816	4.33
B1113: Treatment and management strategies	0.22	0.884	4.07
B1114: Types and functions of pressure-relief devices	0.19	0.756	4.00
B1115: Selection and use of dressings	0.11	0.507	4.60
B1116: Psychological care interventions	0.16	0.737	4.60
B1117: Communication skills	0.16	0.743	4.53
B12: Practical skills module	0.13	0.617	4.67
B121: Repositioning techniques	0.16	0.737	4.60
B122: Transfer techniques	0.09	0.414	4.80
B123: Wound dressing procedures	0.14	0.640	4.47
B124: Use of mobility aids	0.10	0.414	4.20
B125: Dressing selection and application	0.17	0.743	4.47
C1: Training approaches	0.07	0.352	4.87
C11: Delivery format	0.13	0.594	4.73
C111: Online theoretical training with monitored engagement and embedded quizzes	0.16	0.737	4.60
C112: In-person practical training	0.13	0.594	4.73

C12: Teaching strategies	0.13	0.594	4.73
C121: Attention (video learning + observation + case-based sessions)	0.10	0.458	4.73
C122: Retention (quizzes, simulations, peer and collaborative learning)	0.07	0.352	4.87
C123: Reproduction (knowledge and skills feedback)	0.11	0.507	4.60
C124: Motivation (encouragement and policy-based incentives)	0.14	0.640	4.53
C13: Training Duration	0.14	0.640	4.53
C131: Online modules (<10 min each; 10–15 sessions over 2 weeks)	0.16	0.737	4.60
C132: Offline sessions (2 h demonstration + staged practice over 2 weeks)	0.14	0.632	4.60
D1: Evaluation system	0.07	0.352	4.87
D11: Knowledge assessment	0.07	0.352	4.87
D111: PI knowledge questionnaire (25 items; score range 0–25)	0.07	0.352	4.87
D12: Practice assessment	0.13	0.594	4.73
D121: PI Practice Questionnaire (20 items; score range 0–60)	0.10	0.458	4.73
D122: PI identification skills assessment using a photographic tool	0.13	0.617	4.67
D13: Attitude Assessment	0.10	0.488	4.67
D131: PI Attitude Questionnaire (8 items; 1–4 scale)	0.05	0.258	4.93
D132: General Self-Efficacy Scale (10 items; 1–4 scale)	0.07	0.352	4.87
D14: Process Evaluation	0.11	0.516	4.53
D141: Evaluation of online tests and offline practice performance	0.10	0.458	4.73
D15: Satisfaction Evaluation	0.07	0.352	4.87
D151: Post-training satisfaction and feedback assessment	0.10	0.458	4.73

We illustrated how SLT was incorporated into the PI training program intervention in **Figure 2**.

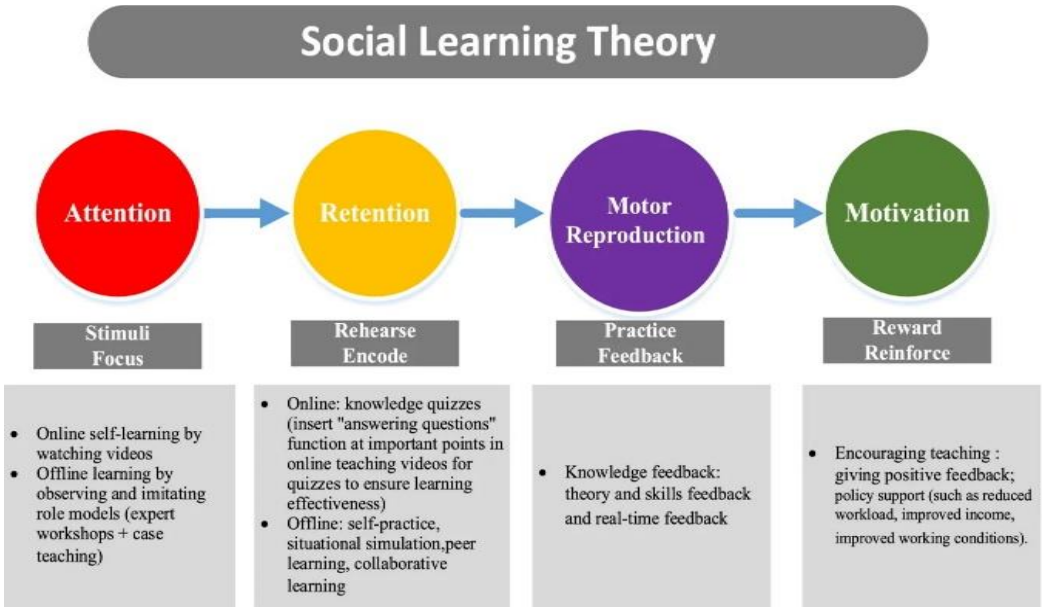

Figure 2. The process of SLT integrating into the PI training program intervention.

This study aimed to develop a comprehensive pressure injury training program tailored for nursing assistants in Chinese nursing homes. It combined Social Learning Theory (SLT) with systematic refinement through the

modified Delphi method. The work stresses the importance of following a structured, theory-based method when designing training, as this can markedly enhance the capabilities of staff responsible for pressure injury prevention and management (PIPM). Both residents' families and other interested parties widely accept that strong PIPM practices are essential in nursing homes, as the incidence and spread of pressure injuries often reflect the overall standard of nursing care [5]. Many studies worldwide have confirmed that poor or inappropriate care delivered by staff plays a major role in causing and aggravating pressure injuries. Nursing assistants, who serve as frontline caregivers, commonly face several challenges: relatively low levels of education, minimal entry requirements, limited professional training, chronic staff shortages, heavy workloads, and modest wages. These factors frequently result in gaps in core nursing knowledge and practical skills, weak supervision, vague role definitions, and excessive demands, all of which harm the quality of care provided [42–44]. For these reasons, targeted training to raise pressure injury competencies among nursing assistants is both necessary and pressing. At present, such training remains limited and incomplete in Chinese nursing homes and across the international community. The newly created SLTbT program on pressure injury provides a clear theoretical foundation to guide future research worldwide.

Using the modified Delphi method, this study gathered input from experts and achieved consensus on the key indicators needed for an effective SLTbT program. This approach is especially helpful when experts from different backgrounds must communicate in an organized way to resolve complicated questions [31, 45]. The modified Delphi process proved effective in aligning opinions among specialists in wound care, community nursing, geriatric nursing, and nursing education. Kendall's W values for the two rounds were 0.372 ($P < 0.001$, $\chi^2 = 429.489$) and 0.177 ($P < 0.001$, $\chi^2 = 207.472$), respectively. Using the заранее defined consensus rules, all indicators achieved strong agreement (mean > 4.0; CV < 0.25). The two-round process enabled careful collection and gradual improvement of expert views. In its final form, the pressure injury training program for nursing assistants contained 79 indicator items: 4 first-level indicators addressing four domains (training objectives, training contents, training methods, training evaluation), 13 second-level indicators (three for training objectives, two for training contents, three for training methods, and five for training evaluation), and 62 third-level indicators (25 for training objectives, 22 for training contents, eight for training methods, and seven for training evaluation).

The PI training program for nursing assistants in Chinese nursing homes is grounded in social learning theory (SLT). This theory explains that individuals learn new behaviors primarily by observing others, imitating what they see, and receiving reinforcement [29]. SLT further suggests that self-directed learning and personal education are best achieved when demonstrations by genuine "role models" are paired with learners' own autonomy and subjective experience [24]. The way the theory was applied here matches results reported in earlier research. Abdullah *et al*. [46], for example, successfully used SLT to boost the professional capabilities of nursing trainees. This solid theoretical base is important because it clarifies the process through which nursing assistants can build the knowledge and skills needed for effective PIPM during the training. By deliberately applying core SLT elements—attention, retention, movement reproduction, and motivation—the program enables participants to master both conceptual understanding and hands-on skills through careful observation and modeling of expert performance.

The suggested PIPM education model combined several approaches: blended modules, interactive sessions, simulation-based activities, peer learning, and case-based group discussions. Observing and copying the practices of expert "role models" in both virtual and face-to-face environments helped spark the nursing assistants' interest and focus on learning. Through peer collaboration and group work, participants could examine their own actions by observing how others learned, creating opportunities for indirect or vicarious reinforcement of positive learning behaviors [47]. Highly applied teaching techniques—such as discussing real cases, running scenario simulations, and allowing repeated independent practice—helped replicate desired behaviors and confirmed the training's overall success. When paired with immediate feedback and steady absorption of new knowledge and skills, the approach increased motivation and encouraged meaningful, in-depth learning.

Beyond that, the study contributes fresh ideas to nursing education by developing an SLT-based training initiative specifically designed to enhance nursing assistants' competence in PIPM. The program was built around the genuine training requirements of nursing home staff and

the clear need for supportive policies. It supplies customized theoretical and practical assistance that respects their limited training schedules, preferred instructional formats, and assessment preferences. At the same time, it confronts practical difficulties involving working conditions, heavy workloads, and insufficient income by recommending relevant policy-level solutions.

This newly created training program or educational model could bring substantial improvements to the future training, education, and professional growth of nursing assistants across China. In particular, it highlights the value of policy measures that would lead to better working environments, reduced workloads, and higher salaries. These same concerns have appeared in previous investigations, in which nursing assistants frequently expressed dissatisfaction with poor working conditions, excessive workload, and low pay [43, 44].

In addition, the findings carry important lessons for clinical practice worldwide. The study calls for stronger policy incentives and underscores the need to advance nursing assistants' knowledge, practical skills, and career aspirations in parallel. It also works to strengthen their sense of professional ethics and role clarity, thereby nurturing sound professional values that help develop truly capable nursing assistants.

Importantly, the content of this PI training program stands apart from most earlier international efforts. For example, Howe [48] introduced a PI education initiative focused primarily on patient skin care. Their approach relied on conventional techniques, including PowerPoint presentations, practical demonstrations, and group discussions [48]. In the skills portion, nursing assistants rehearsed proper patient positioning, operation of specialized beds, and techniques for relieving pressure at vulnerable points [48]. Similarly, Cross *et al*. [49] developed a PI training program for nursing assistants in residential care settings that focused solely on fundamental knowledge and skills. It consisted solely of 2-hour lectures delivered by a clinical nurse specialist and did not include a final competency assessment. Moreover, nearly all prior studies relied on outdated clinical guidelines when designing content and rarely evaluated whether the training actually improved participants' competencies. Research specifically targeting training for PI management and ongoing care remains scarce; most available programs have centered narrowly on prevention alone [50, 51].

By comparison, the current study developed its program according to the most recent international guideline. The curriculum comprehensively addresses a wide range of topics, including basic concepts, risk factors, underlying causes and mechanisms, clinical staging, risk assessment tools, core management and treatment approaches, skin care, nutritional support, prevention techniques, communication strategies, psychological care, legal considerations, ethical issues, and additional related areas.

In China, no nationwide training program exists specifically for nursing assistants employed in nursing homes [52]. Nursing assistants in China tend to begin their careers at a relatively advanced age. Although some long-term care facilities offer programs to strengthen occupational competencies, there is insufficient evidence to confirm their effectiveness. This is largely because the programs are not standardized or systematic and show minimal impact on knowledge and skills related to pressure injury (PI) [43]. Individual nursing homes adopt different training programs, all of which are based on the Nursing Assistant Training Syllabus issued by the National Civil Bureau [53]. This syllabus covers topics including daily care, basic care, rehabilitation services, psychological support, hospice care, care assessment, quality management, training guidance, and various other related knowledge and skills [53]. Nevertheless, the sections dedicated to pressure injury receive very limited attention and sometimes consist of only 1 hour within the entire training program. As a result, the actual outcomes of PI training cannot be assured.

In addition, the few PI training programs available worldwide are primarily designed for nurses, patients, family caregivers, or hospital-based nursing assistants. The quality of the curriculum, content, teaching methods, and evaluation approaches differ considerably across these programs [43, 52, 54]. Moreover, these programs tend to be overly general and fail to concentrate sufficiently on the specific competencies required for pressure injury prevention and management (PIPM), which are vital for delivering high-quality care in nursing home settings. Globally, there remains a clear shortage of systematic and comprehensive PI-focused training programs that target nursing assistants' competencies in nursing homes.

Therefore, the present study holds strong potential to markedly improve the quality of care provided to residents in nursing homes through the implementation of the SLTbT program. It is also expected to exert broad

and profound effects on international public health and clinical practice, including the development of nursing assistants, policy formulation, nursing management, raising public awareness, addressing challenges associated with aging populations, and related issues.

Limitations

This study has several limitations. First, it relied on a modified Delphi method to reach consensus among an expert panel. Although this approach is useful for gathering collective expert views, the relatively small number of experts involved may not fully capture the diverse perspectives of all stakeholders, potentially limiting the generalizability of the results. Second, because the Delphi method relies on experts' subjective opinions, it may introduce personal biases, potentially reducing the accuracy of responses. Third, the study did not conduct a pilot test of the training intervention in actual clinical settings, which could have provided important insights into the program's practicality and effectiveness.

Conclusion

This study successfully created a theoretically sound PI training program for nursing assistants working in Chinese nursing homes. By combining Social Learning Theory with the modified Delphi method, the program effectively meets the urgent need for high-quality PI training and makes a meaningful contribution to geriatric care. The detailed training indicators established in this work provide a strong basis for enhancing pressure injury prevention and management practices, ultimately benefiting the wellbeing of older residents. However, the program's real-world effectiveness has not yet been empirically tested. Future studies should therefore prioritize examining the program's implementation and assessing its effects on both nursing assistants' performance and the health outcomes of older adult residents.

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