An evaluation of preschool educators’ life skills health education capacity: Scale development and verification

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Abstract

Background: Preschool educators who facilitate life skills health education have an important role. Limited research has explored the comprehensive content and strategies of courses related to health education in kindergarten. The aim of this study is to create a questionnaire scale suitable for assessing preschool educators’ capacity for life skills health education in Taipei, Taiwan.

Methods: A cross-sectional study design was used to explore and assess life skills health education as a teaching approach for preschool educators. The scale was developed in three steps. The first step was to create a draft questionnaire that passed a validation review by 9
experts. The second step was a pretest (N=128) with category analysis and exploratory factor analysis (EFA) to create the formal version of the scale. The dimension analysis of the scale to assess the life skills health education capacity of preschool educators in kindergartens included cognition, attitude and self-efficacy. The third step was official testing (N=503), in which the efficacy criterion correlation validity test showed good simultaneous validity and discrimination.

**Results:** The first draft of the pretest analysis contained 45 initial questions; 38 questions remained after 7 questions were deleted based on the EFA. According to the theoretical framework and after deleting 8 items that did not conform to the standard, a total of 30 questions were included in the formal scale. The two factors in the cognitive subscale were "health-promoting kindergarten" and "life skills teaching" for a total of 9 questions, and the two factors in the attitude subscale were "perceived benefits" and "perceived barriers" for a total of 11 questions. The three factors of the self-efficacy subscale were "adaptability and self-management ability", "decision-making and critical thinking ability" and "communication and interpersonal communication ability" for a total of 10 questions.

Cronbach's α coefficient for each subscale fell in the range of .81 to .936.

**Conclusions:** This scale has satisfactory reliability and validity and can be administered to assess the outcomes of pedagogical training for life skills health education for preschool educators in health-promoting kindergartens.

**Trial registration:** Not applicable.

**Keywords:** preschool educator, life skills, health education
Background

According to several national surveys on domestic health conditions, many children’s health issues persist in Taiwan, including vision, dental care, diet, obesity, inadequate exercise, and infectious diseases [1-3]. Preschool educators have frequent contact with children during their behavioral development and are therefore the best role models for their students when they have exemplary health cognition and behavior. Because kindergarten is a workplace for educators, their best performance is only possible when they strongly believe in and are dedicated to ensuring children’s health. However, it is unclear whether they are aware of the health issues of young children. Do they impart correct health knowledge and skills? Limited research has explored the comprehensive content and strategies of courses related to health education in kindergarten.

The World Health Organization (WHO) considers health education to be any learning experience designed to help individuals and communities improve people's health by increasing their knowledge or influencing their attitudes [4]. Because it provides learning experience and cultivating the health knowledge, attitudes and behaviors of individuals and communities, health education is crucial to obtaining a high quality of life and preventing diseases [5]. The practice of early health education mainly relied on the distribution of information and facts. Education gradually changed to focus on the development of skills and an emphasis on various health aspects, such as physical, societal, emotional and spiritual aspects. In view of this, health education should be gradually cultivated at an early age to allow individuals to develop positive and healthy behaviors [6]. Preschool age is an important stage of rapid physical and mental development for children. Many child psychologists agree that this period is a critical time in life and is an important stage before children undertake elementary school. This is the perfect time to develop good basic behaviors, health
knowledge and attitudes. Moreover, preschool experiences and education often affect one's entire life and are not easy to change after this time [7].

The Ministry of Health and Welfare, the Ministry of Education and the county and city government health bureaus in Taiwan began to promote kindergarten health programs in 2020 [8]. This promotion focuses on kindergartens’ health policies, children's health skills and behaviors, parents' communication and community resources. This program is still in its promotion stage. To promote health policy in kindergartens and to educate children about health skills and behaviors, it is important for preschool educators to have the capacity to promote health-related concepts and life skills health education in kindergartens.

Preschool educators who facilitate life skills health education have an important role. Education scholars have noted that in curriculum implementation, teachers’ organization of learning experiences and management of the learning environment for the benefit of children are factors in determining outputs [9, 10]. The Life Skills Program is one of the newest programs in the Kenya preschool educational system. This system recommends the development of clear policy and supervisory guidelines to allow the effective implementation of the Life Skills Program to benefit all children [11]. Similarly, we can apply life skills education strategies to teach kindergarten children health skills and behaviors for various health issues in Taiwan.

As health education and life skills have evolved during the past decade, there is growing recognition and evidence of the role of psychosocial and interpersonal skills in the development of young people, from their earliest years through childhood, adolescence, and into young adulthood. The life skills health education approach addresses real-life applications of essential knowledge, attitudes, and skills and employs interactive teaching and learning methods. Numerous studies have confirmed that life skills allow individuals to acquire abilities and engage in healthy, positive behaviors [12]. The Global Bight Horizons
Education Organization describes these skills as "learning through learning", implying that they can be developed through planned daily activities. This organization explores 7 basic life skills that can help children succeed and provides some simple methods to cultivate these skills in preschool children, including concentration and self-control, self-awareness, effective communication, negotiation skills, critical thinking, problem solving, and autonomous learning [13]. Robinson et al. [14] studied life skills guidance for children with learning disabilities. They taught 12 life skills to 9 participants with 4 designed teaching units of activities as guidance. Teachers started with whole-class teaching, followed by group teaching and one-on-one teaching, if necessary. The results showed that the 9 participants were able to retain life skills for 4 weeks after teaching.

The WHO [15] defined life skills as abilities for adaptive and positive behavior that enable individuals to deal effectively with the demands and challenges of everyday life. Life skills may be directed toward personal actions or actions toward others as well as toward actions to change the surrounding environment to make it conducive to health. Life skills are interrelated, and several of them can be taught together in a learning activity. Life skills for skills-based health education include the core set of skills at the heart of skills-based initiatives that promote the health and well-being of young people include the following [16]: (1) decision-making and problem-solving; (2) critical and creative thinking; (3) communication and interpersonal relationships; (4) self-awareness and empathy; and (5) coping with stress and emotion. However, there has been no research on preschool educators' application of life skills-oriented health education, and there is no training in life skills as an education method for preschool educators that is beneficial to kindergarten children's health skills and behaviors.

In this study, we aimed to develop a scale that could measure preschool educators' life skills cognition about a known situation and identify what educators know about life skills
health education. In addition, this investigation assessed preschool educators' life skills health education attitudes and self-efficacy for using a life skills health teaching education approach. Therefore, we refer to the knowledge, attitudes, and practice (KAP) theory to design the questionnaire. KAP is a framework used to conduct representative studies on specific populations and focuses on investigating what humans know and feel about a topic as well as their associated actions [17]. This survey is a quantitative method. KAP surveys reveal misconceptions or misunderstandings that may represent obstacles to activities to be implemented and potential barriers to behavior change [18]. We initiated life skills health education to help preschool educators enhance their knowledge, attitudes, and practices in relation to specific themes and improve the effectiveness of the ability of health education activities to change children's health behaviors.

There are very few studies on kindergarten health education, let alone on life skills education for health-related issues. In view of this, we believe the topic is worthy of in-depth investigation. The objective of this research was to construct various scales for measuring life skills education on health issues for preschool educators to provide a preliminary exploration of the program.

Methods
The research subjects included a target population of both public and private preschool educators in the regions of Taipei City and New Taipei City. On June 1, 2017, the researcher obtained information on the number of public (3,785) and private (12,982) preschool educators in the regions of Taipei City and New Taipei City from the statistics bureau website of the Ministry of Education [19]. The subjects were randomly sampled by hierarchical clustering and classified as private or public kindergartens. Then, the number of preschool educators at each education level was calculated along with the ratio, resulting in
23% and 77%, respectively, for public and private kindergartens. Based on two administrative levels of public and private kindergartens, kindergarten institutions were pooled for random drawing. A 95% confidence interval and ±5% range of error were set for the experiment. Sampling accounted for the number of kindergartens in the administrative districts of Taipei City and New Taipei City, including 147 public and 514 private kindergartens in Taipei City (covering 12 administrative districts) and 293 public and 827 private kindergartens in New Taipei City (covering 29 administrative districts) [19]. Because of the various kindergarten sizes, the number of preschool educators varied. Regarding the ratios of public and private kindergartens, 764 survey questionnaires were distributed with 558 copies collected, yielding a retrieval rate of 73.04%. After removing invalid ones, 503 valid questionnaire forms remained, with an availability rate of 90.14%.

A cross-sectional study design was used to explore and assess life skills health education as a teaching approach for preschool educators. Based on the theoretical framework of KAP, this study designed a self-compiled structured questionnaire. For the developmental scale, 9 experts (3 domestic health promotion and education experts and scholars, 3 preschool education experts and scholars and 3 senior preschool educators) were invited to evaluate the applicability, accuracy and integrity of the questions and to provide suggestions for modification. After collecting and sorting the opinions of the experts and scholars, the content validity of the questionnaire was verified. In the content review analysis, the number distribution and percentage methods were used to screen the questions. If the combined proportion in the categories of "suitable" and "revised suitable" reached more than 90%, the questions were retained. The results of these reviews by experts and scholars were used to test the validity of the questionnaire content and formed the basis for revising the pretest questionnaire. The research tool was a four-part, self-compiled structured questionnaire that included (1) background information on the kindergarten educator
(location of serving kindergarten, type of kindergarten, current position, service years, education level, and age); (2) 15 questions that probed preschool educators’ cognition of life skills, evaluated on the subscale “Cognition”; (3) 17 questions that referred to the preschool educators' recognition of their attitudes toward life skills health education in the subscale “Attitude”; and (4) 13 questions that self-assessed preschool educators’ self-efficacy based on their degree of confidence that they could conduct the life skills health education as a teaching approach for children in the subscale “Self-efficacy”. The questions included a five-point Likert scale (1-Strongly Agree, 2-Somewhat Agree, 3-Neutral, 4-Somewhat Disagree, 5-Strongly Disagree) and were open ended. The higher the score, the better the subjects' cognition, attitude and self-efficacy in relation to life skills health education.

The degree of identification and internal consistency confidence test were conducted for the scale. Before exploratory factor analysis (EFA) was conducted, the Kaiser-Meyer-Olkin (KMO) test and Bartlett test of sphericity were used to confirm the suitability of conducting factor analysis. EFA involved principal component analysis (Promax) to extract factors and used the practical significance of a factor load greater than .50 as the question selection standard; cross-factor questions were removed [20, 21]. Then, Cronbach’s α coefficient was used to measure the consistency and stability of each scale item. According to DeVellis’s [22] suggestion, when the value is lower than .60, it is not accepted. According to the pretest results, the revised scale was formally tested, and the reliability and validity of the scale were reconfirmed by an internal consistency confidence test and criterion correlation validity analysis.

Results

Item analysis
Based on the responses of the 128 kindergarten teachers to 45 questions in the pretest chart, items were analyzed and deleted. The item analysis adopted discriminatory analysis and an internal consistency confidence test. The data of this scale showed that in the extreme group test method, the critical value (CR) of all questions reached a significant level ($p < .001$), indicating that all questions had a good degree of discrimination. In terms of the homogeneity test, the correlation coefficient of the total score of the corrected items was higher than .30 and significant. After the deleted items were examined, the internal consistency coefficient, Cronbach's $\alpha$, showed significant improvement and was retained [23]. The results of this subscale showed that the Cronbach's $\alpha$ value of 12 questions (after deleting questions 4, 8 and 11 for "cognition") was .861, the Cronbach's $\alpha$ value of 14 questions (after deleting questions 1, 2 and 11 for "attitude") was .912, and the Cronbach's $\alpha$ value of 12 questions (after deleting question 1 for "self-efficacy") was .937. Therefore, 38 questions were retained after deleting questions, and the Cronbach's $\alpha$ value of the overall scale was .920.

**Exploratory factor analysis (EFA)**

After the questions were deleted from the analysis, EFA was conducted on cognition, attitude and self-efficacy. Before the factor analysis, we first determined whether the research data were suitable for factor analysis. The KMO measure of sampling adequacy was used to test the net correlation coefficient between variables (the closer KMO is to 1, the lower the net correlation coefficient between variables and the better the effect of factor analysis to extract common factors). Bartlett’s test of sphericity was used to test whether the correlation coefficient in the correlation matrix showed significance [24]. The main component analysis, the Promax axis method, was used for analysis. The results showed that the KMO value and Bartlett's spherical test values for the Cognitive, Attitude, and Self-efficacy scale were .806, 859.541 ($p < .001$), .903, 1316.334 ($p < .001$), and .874, 1062.847 ($p < .001$), respectively,
which were all higher than .80. Bartlett's spherical scale showed significant results, indicating that all data from the three subscales fit for factor analysis.

**Cognition Subscale**

According to the preliminary analysis, three factors were extracted. Questions 7 and 10 involved two factors. Thus, after deleting these questions, factor analysis was performed. In terms of the three factors, only five questions remained to constitute one specific factor; therefore, they were deleted, and two factors were extracted. The results showed that in the cognitive subscale, the factor load of each question item exceeded .50, and two factors were extracted from 9 questions, as shown in Table 1. The factor load of "life skills health teaching" was .641 to .853, and the factor load of "health promotion kindergarten" was .660 to .937. The cumulative explanatory variation of the scale reached 64.69%, and the internal consistency of each factor was .808 and .848, respectively.

(Table 1 is about here.)

**Attitude subscale**

According to the preliminary analysis, two factors were extracted due to the removal of questions 4, 7 and 10, which involved two factors. The results showed that in the attitude subscale, the factor load of each item exceeded .50, and two factors were extracted from 11 questions, as shown in Table 2. The factor load of "perceived benefits" was .735 to .937, while that of “perceived barriers” was .579 to .817. The cumulative explanatory variance of the scale reached 65.84%, and the internal consistency of each factor was .927 and .791, respectively.

(Table 2 is about here.)
**Self-efficacy subscale**

In the self-efficacy evaluation, 3 factors were analyzed according to the set theoretical questions. Questions 2 and 13 involved 2 factors; therefore, factor analysis was performed after deleting these questions. The final factor analysis results of 10 questions could be categorized into 3 factors, as shown in Table 3. The factor load of "adaptability and self-management ability" was .897 to .939, the factor load of “decision-making and critical thinking” was .579 to .947, and the cumulative explanatory variance of the scale reached 81.40%, yielding internal consistency of each factor of .834 and .836, respectively.

(Table 3 is about here.)

**Analysis of personal background as variables for the research subjects**

Table 4 shows that the number of preschool educators surveyed at the kindergarten in which they served was 259 (51.5%) in New Taipei City and 244 (48.5%) in Taipei City. By classification of kindergarten type, more educators were in private institutions (approximately 305 personnel, accounting for 60.6%), while 198 educators were in public institutions (39.4%), which showed a similar distribution ratio of the target population. Regarding the distribution of their current position, most were categorized as “teachers” (approximately 206 personnel, 45.9%). With regard to education level, the highest ratio had an undergraduate degree (approximately 344 educators, 68.2%). Their age was evenly distributed across all age groups, with “above 50 years old” as the smallest group. Regarding teaching seniority (service years), most (159 people, 31.6%) had already taught for “over 20 years”. The remaining participants had at least 3 years of teaching experience. The subjects included in this study had good educational backgrounds and stable work experience.

(Table 4 is about here.)
Reliability analysis and descriptive statistics of formal scale

The formal scale of life skills education consisted of 30 items. In the cognitive subscale, the Cronbach's α coefficient of overall cognition was .834, while the coefficients of "life skills health teaching" and "health-promoting kindergarten" were .863 and .813, respectively. In the attitude subscale, the Cronbach's α coefficient of overall attitude was .860, while the coefficients of "perceived benefits" and "perceived barriers" were .936 and .843, respectively. In the self-efficacy subscale, the Cronbach's α coefficient of overall self-efficacy was .935, while the coefficients of "adaptability and self-management ability", "decision-making and critical thinking ability" and "communication and interpersonal communication ability" were .933, .834 and .836, respectively. The overall Cronbach's α coefficients were higher than 0.8, which indicated that the scales had good reliability performance and indicated good internal consistency between questions.

The mean and standard deviation of each dimension of the Life Skills Health Education Scale can be seen in Table 5. The responses of the research subjects on each scale are presented to understand the construct validity of the scale. The research subjects scores for the mean and standard deviation of "cognition", "attitude", and "self-efficacy" were 3.88 (.58), 3.27 (.53) and 3.85 (.68), respectively. On the whole, the average scores of the research subjects' cognition, attitude and self-efficacy of life skills health education were all in the middle to upper level.

(Table 5 is about here.)

Criterion correlation validity analysis

This study used simultaneous validity and discriminant validity to test the criterion-related validity. The judgment standard referred to Li [24]. If the correlation between indicators from two different constructs was greater than .85, it indicated a possible question for deletion; the
correlation between different constructs should be less than .70. Table 6 shows that in the correlation analysis of the overall scale, the correlation coefficients of "cognition" and "attitude" \( (r = 1.91, p < .001) \), "cognition" and "self-efficacy" \( (r = .541, p < .001) \), and "attitude" and "self-efficacy" \( (r = .207, p < .001) \) were less than .70, demonstrating discrimination. The cognitive subscales "life skills health teaching" and "health-promoting kindergarten" \( (r = .329, p < .001) \) and “perceived benefits” and “perceived barriers” \( (r = .241, p < .001) \) reached significant levels; the self-efficacy subscale of "adaptation and self-management ability" and "decision-making and critical thinking ability" \( (r = .688, p < .001) \), "adaptation and self-management ability" and "communication and interpersonal communication ability" \( (r = .714, p < .001) \), and "decision-making and critical thinking ability" and "communication and interpersonal communication ability" \( (r = .710, p < .001) \) also showed significance. The correlation coefficients reached a significance level above .05, supporting simultaneous validity. The correlation coefficient of each factor on the subscale was significantly less than 1, which also showed that the questions within the constructs of these scales had good discriminant validity [25].

(Table 6 is about here.)

**Discussion**

To promote life skills health education, this study developed the content of the research scales by combining the concept of health-promoting schools and life skill health-oriented education, which was examined through three stages: expert validity review, a pretest and a formal test. Forty-five questions were in the first draft of the pretest analysis, and 38 questions remained after 7 questions were deleted during exploratory factor analysis. According to the theoretical framework and after deleting 8 items that did not conform to the standard, a total of 30 questions were included in the formal scale. The Cronbach's \( \alpha \)
coefficient of each subscale fell in the range of .81 to .936. The criterion correlation validity test showed satisfactory simultaneous validity and discriminant validity. The measurement approach of this study showed acceptable reliability and validity.

The two factors in the cognitive subscale were "health-promoting kindergarten" and "life skills teaching" for a total of 9 questions, which conform to the theoretical classification [6]. It assessed the preschool educators' "life skills teaching" cognition, that health teaching should enable children to acquire healthy life skills, such as physical activity, accidents Injury prevention, oral hygiene, vision care, healthy eating, sex education (self-protection), prevention of infectious diseases, etc. The preschool educators believed "health-promotion kindergarten" that health promotion kindergartens and health education curriculum should be combined with the kindergarten community-related issues, so that children can use what they have learned in their lives and cultivate the ability to manage health independently.

The two factors in the attitude subscale were "perceived benefits" and "perceived barriers" for a total of 11 questions. Through the results of the test, we found that the attitude of preschool educators was more inclined to "perceived benefits", and the average score was higher than "perceived barriers". For example, the higher-scoring topic "Life skills teaching can improve children's abilities in various fields and help improving and solving health problems for young children", "Using life skills teaching can help education and health service personnel have a clearer direction to formulate health teaching goals." The topics below the average score of 2.68 include the promotion of health promotion kindergarten which is difficult for me and the teaching of life skills which is unfamiliar to me.

The three factors in the self-efficacy subscale were "adaptability and self-management ability", "decision-making and critical thinking ability" and "communication and interpersonal communication ability" for a total of 10 questions, which conform to the theoretical classification [15]. This study found that the average scores of the subjects' self-
efficacy for life skills health education were all in the middle or upper level. This result indicated that preschool educators were not completely unfamiliar with health-promoting kindergartens and life skills teaching. They all supported and attached importance to attitude and had confidence in their self-efficacy to conduct life skills teaching. This finding corresponds with the studies of Hanley et al. [26] and Fahmie and Luczynski [27] with regard to the prediction and implementation of life skills education to enable young children to acquire more life skills. It is suggested that the universality, feasibility, and acceptability of such programs could be improved.

However, many believe that these life skills fundamentally do not target preschool children but rather target children of other ages and young adolescents [28]. This study differs from previous studies in that it presents a scale suitable for evaluating the life skills education of preschool educators. This scale can also inspire preschool educators in kindergartens to promote concepts of health and design activities to teach life skills. This is also in line with Taiwan's current kindergarten health-promotion program, "Children's Health Skills and Behaviors", which emphasizes children's health knowledge, skills, and motivated actions. The concept of health is designed into the curriculum, and children's life skills are integrated into it. Through interventions and changes in healthy behaviors, healthy living habits are formed, and children's healthy bodies and sound personalities are cultivated [8].

Kindergarten provides children with a learning environment for growth, which should be on a health-promoting campus. Health-promoting kindergartens are developed through an atmosphere of health promotion. Children in these kindergartens can have a healthy life and learn and grow steadily. Regardless of the type of kindergarten or the curriculum, such as Montessori, Waldorf or bilingual kindergartens, and despite their features, all kindergartens have the same common foundation, that is, to enable all children and teaching colleagues to learn and teach healthily and happily in the same place in a general environment of health
promotion. Therefore, every kindergarten must be a health-promoting kindergarten, and life skills-oriented health education can be used as the core program to cultivate children’s overall literacy and health. At the beginning of the health promotion program by the Ministry of Health and Welfare, the Ministry of Education, and the health bureaus of county and city governments in Taiwan, it is important to become familiar with the concept of health-promoting kindergartens and the application of life skills teaching.

**Conclusions**

The Life Skills Teaching Scales developed by this research included two factors, "life skills health teaching" and "health-promoting kindergarten” for cognition; two factors, "perceived benefits" and "perceived barriers" for attitude; and three factors of self-efficacy, "adaptability and self-management ability", "decision-making and critical thinking ability" and "communication and interpersonal communication ability", resulting in a total of 30 questions. After the expert validity test, pretest analysis and exploratory factor analysis, reliability and criterion correlation validity analyses were conducted after the formal scales were tested, showing satisfactory reliability and validity of the scales. In practice, the results could be provided to educational institutions or teacher training institutions. The concepts of health-promoting kindergartens and life skills health teaching are especially important when preschool educators study on the job or in related programs. The scales can evaluate these personnel's cognition, attitude, and self-efficacy toward life skills education. In addition, it is hoped that these scales can be provided to education authorities to establish norms. The implementation of a kindergarten health-promoting program will include training in life skills education for preschool educators. The pre- and posttest results were evaluated with these scales. In the future, further life skills health teaching research will be conducted for
children's health issues that are of concern to preschool educators to improve these personnel’s health education abilities.

List of abbreviations

ANOVA: Analysis of Variance; a statistical method in which the variation of a set of observations is divided into distinct components.

EFA: Exploratory Factor Analysis

KAP: Knowledge, Attitudes, and Practice

KMO: Kaiser-Meyer-Olkin

N: Number of participants

CR: Critical Ratio

WHO: World Health Organization

Declarations

The authors confirm that all methods were carried out in accordance with relevant guidelines and regulations.

Ethical approval and consent to participate

This study was approved by Research Ethics Committee, National Taiwan Normal University on January 7, 2019. REC Number: 201810HS025. All participants in this study have informed consent was obtained from all subjects.

Consent for publication

Not applicable.
Availability of data and materials

The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors’ contributions

HLC analyzed and interpreted the data regarding the life skills cognition, attitude, and self-efficacy. CHL revised the manuscript and was a major contributor in writing the manuscript. All authors read and approved the final manuscript.

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### Table 1. Cognition subscale summary

| Item                                                                 | Factor | Health promotion kindergarten |
|----------------------------------------------------------------------|--------|-------------------------------|
| 13. Self-awareness skills refer to being able to identify and understand one's own feelings, beliefs, attitudes, values, goals, motives, and actions. | .853   |                               |
| 15. Self-health management refers to being able to keep one's situation and lifestyle in the best state and achieve or maintain one's physical, social, emotional, and environmental health. | .821   |                               |
| 14. Refusal skills refer to the ability to effectively reject others through spoken and non-spoken messages. | .809   |                               |
| 6. Health education should enable children to acquire healthy life skills, such as physical activities, accident injury prevention, oral hygiene, vision care, healthy diet, sex education (self-protection), prevention of infectious diseases, etc. | .808   |                               |
| 12. Critical thinking skills refer to analyzing information and experience, forming opinions, guiding conclusions, asking appropriate questions, and publishing logical thinking ideas. | .641   |                               |
| 2. Kindergartens should plan assessments of various health issues and improvement needs by selecting health issues, progress indices, implementation methods and time schedules in the kindergarten every year. | .937   |                               |
| 1. The health promotion kindergarten program should include six categories: health policy, material environment, social environment, community relations, personal health life skills education, and health services. | .860   |                               |
| 9. The health education curriculum should be combined with community-related issues in kindergartens so that children can apply what they have learned to their lives and cultivate their ability for healthy and independent management. | .688   |                               |
| 3. Kindergartens can communicate with parents about their children’s development and provide relevant publications by using interactive materials with parents, such as parent contact books, literature announcements or notices about health issues to promote. | .660   |                               |
| Explanatory variance                                                   | 39.79% | 24.91%                        |
| Accumulative explanatory variance                                      | 39.79% | 64.69%                        |
| Internal consistency                                                   | .808   | .848                          |
| Item                                                                 | Factor                  | Perceived benefits | Perceived barriers |
|----------------------------------------------------------------------|-------------------------|--------------------|--------------------|
| 9. The implementation of life skills education can stimulate the      | .934                    |                    |                    |
| children’s motivation to learn.                                      |                         |                    |                    |
| 8. Life skills education allows preschool educators to clearly       | .900                    |                    |                    |
| formulate teaching objectives.                                       |                         |                    |                    |
| 10. The implementation of life skills education can enhance the      | .890                    |                    |                    |
| communication and interaction between preschool educators and young  |                         |                    |                    |
| children and promote a good learning atmosphere and class management.|                         |                    |                    |
| 13. Life skills education can enhance young children's abilities in  | .874                    |                    |                    |
| various fields and help young children improve and solve health      |                         |                    |                    |
| problems.                                                           |                         |                    |                    |
| 15. Cultivating professional knowledge of life skills education for   | .786                    |                    |                    |
| preschool educators in health is imperative.                        |                         |                    |                    |
| 3. Health-promoting kindergartens should establish partnerships with | .735                    |                    |                    |
| community institutions or parents.                                   |                         |                    |                    |
| 14. It is difficult to implement life skills education at this stage. | .817                    |                    |                    |
| 6. Principals, directors or supervisors are responsible for organizing kindergarten health-promoting activities. | .816                    |                    |                    |
| 5. It is difficult for me to promote the health-promoting kindergarten. | .742                    |                    |                    |
| 16. It is difficult to implement life skills education at this stage. | .740                    |                    |                    |
| 12. The implementation of life skills education by preschool         | .579                    |                    |                    |
| educators may require more effort than adopting the general teaching mode. |                         |                    |                    |
| Explanatory variance                                                 | 42.60%                  | 23.25%             |                    |
| Accumulative explanatory variance                                    | 42.60%                  | 65.84%             |                    |
| Internal consistency                                                 | .927                    | .791               |                    |
### Table 3. Self-efficacy subscale summary

| Item | Factor | Adaptation and self-management capabilities | Decision-making and critical thinking ability | Communication and interpersonal skills |
|------|--------|---------------------------------------------|-----------------------------------------------|---------------------------------------|
| 10. I can teach children to use life skills in terms of self-health management and proper personal hygiene habits, such as washing hands, going to the toilet, blowing their nose, etc. | .939 | | | |
| 11. I can teach children to use life skills in terms of self-health management and environmental hygiene, such as tidying up the environment after meals, cleaning the environment, tidying up toys, etc. | .932 | | | |
| 12. I can teach children in kindergartens how to use life skills in terms of self-health management, such as how to clean their teeth after meals. | .912 | | | |
| 9. I can teach children to use life skills in terms of self-awareness so that when they feel a painful or prickling sensation in their eyes, they will immediately stop watching the screen and let their eyes rest. | .897 | | | |
| 6. I can use life skills such as critical thinking to teach children to identify safe and fresh food and learn to consume more dark green vegetables and fruits rich in the vitamin A, B and C groups. | .947 | | | |
| 5. I can use life skills of decision-making and teach children good eating behaviors, such as chewing slowly, eating fixed amounts and at fixed intervals, and sitting properly to eat well. | .849 | | | |
| 4. I can use life skills of critical thinking to teach children to learn to distinguish safe and unsafe movements to avoid collision with others and equipment during games and rhythmic activities. | .579 | | | |
3. I can use life skills of effective communication to teach children to use spoken or physical expressions of information and ideas to others, especially to communicate their needs or appropriate movements.

7. I can use life skills of refusal to teach children the safety awareness of avoiding strangers and self-protection, such as the protection of private parts (referring to organ cleaning, wearing underpants, etc.).

8. I can use life skills of interpersonal skills to teach young children to build friendships with each other, learn to interact with others and be polite.

| Explanatory variance | 62.93% | 10.81% | 7.66% |
|----------------------|--------|--------|-------|
| Accumulative explanatory variance | 62.93% | 73.74% | 81.40% |
| Internal consistency | .943 | .834 | .836 |
**Table 4. Analysis of basic information of preschool educators (N = 503)**

| Background variables | Group               | Number (%) |
|----------------------|---------------------|------------|
| Location             | New Taipei City     | 259(51.5)  |
|                      | Taipei City         | 244(48.5)  |
| Type                 | Private             | 305(60.6)  |
|                      | Public              | 198(39.4)  |
| Job title            | Teacher             | 206(45.9)  |
|                      | Principal & Director| 168(33.4)  |
|                      | Educare giver       | 80(15.9)   |
|                      | Educare assistant   | 24(4.8)    |
| Education            | Undergraduate       | 344(68.2)  |
|                      | Master’s and above  | 87(17.5)   |
|                      | Junior college      | 72(14.3)   |
| Age                  | >40—50              | 178(35.4)  |
|                      | >30—40              | 140(27.8)  |
|                      | >20—30              | 104(20.7)  |
|                      | Above 50            | 81(16.1)   |
| Service years        | Below 10            | 191(38.0)  |
|                      | Above 20            | 159(36.1)  |
|                      | >10—20              | 153(30.4)  |
### Table 5. Reliability, mean and standard deviation (N=503) of each subscale.

| Subscale/Factor                       | Number of questions (30) | Cronbach's α | Mean (SD)     |
|---------------------------------------|--------------------------|--------------|---------------|
| Total cognition                       | 9                        | .834         | 3.88 (.58)    |
| Life skills health teaching           | 5                        | .863         | 3.77 (.71)    |
| Health--promoting kindergarten        | 4                        | .813         | 4.24 (.63)    |
| Total attitude                        | 11                       | .860         | 3.27 (.53)    |
| Positive attitude                     | 6                        | .936         | 3.86 (.63)    |
| Negative attitude                     | 5                        | .843         | 2.68 (.72)    |
| Total self-efficacy                   | 10                       | .935         | 3.85 (.68)    |
| Adaptation and self-management capabilities | 4                  | .933         | 3.74 (.79)    |
| Decision-making and critical thinking ability | 3                  | .834         | 3.74 (.75)    |
| Communication and interpersonal skills | 3                      | .836         | 4.06 (.75)    |
Table 6. Correlation matrix of "cognition", "attitude", "self-efficacy" and various factors in life skills education

| Factor                                      | 1  | 1-1 | 1-2 | 2  | 2-1 | 2-2 | 3  | 3-1 | 3-2 | 3-3 |
|---------------------------------------------|----|-----|-----|----|-----|-----|----|-----|-----|-----|
| 1 Cognition                                 |    |     |     |    |     |     |    |     |     |     |
| 1-1 Life skills health teaching             | 1  | .777** |        | 1 |     |     |    |     |     |     |
| 1-2 Health-promoting kindergarten            |    | .850** | .329** | 1 |     |     |    |     |     |     |
| 2 Attitude                                  |    | .191** | -.062 | .338** | 1 |     |    |     |     |     |
| 2-1 Positive cognition                      |    | .350** | .011 | .517** | .799** | 1 |     |     |     |     |
| 2-2 Negative cognition                      |    | -.060 | -.112* | .003 | .776** | .241** | 1 |     |     |     |
| 3 Self-efficacy                             |    | .541** | .216** | .632** | .207** | .372** | -.056 | 1 |     |     |
| 3-1 Adaptation and self-management capabilities |    | .527** | .254** | .577** | .243** | .359** | .016 | .898** | 1  |     |
| 3-2 Decision-making and critical thinking ability |    | .449** | .166** | .535** | .249** | .362** | .022 | .890** | .688** | 1  |
| 3-3 Communication and interpersonal skills  |    | .477** | .156** | .584** | .061 | .276** | -.192 | .900** | .714** | .710** | 1  |

*p<.05,  **p<.01,  ***p<.001
