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# Design and assessment of psychometric features of life skills inventory

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## Abstract:

**INTRODUCTION:** The importance of life skills and their application in promoting personal, family, and occupational health in military personnel is well recognized. It is, therefore, important to identify and assess life skills in military personnel with a valid and reliable tool. The present study aims to develop such a tool and evaluate its psychometric features in military personnel.

**MATERIALS AND METHODS:** As part of a mixed study, a qualitative concept analysis study was conducted using hybrid approach to redefine life skills in military personnel, and results obtained were used to form a pool of items. Next, in a methodological study, psychometric evaluation, qualitative and quantitative face validity, qualitative and quantitative content validity, and construct validity (exploratory factor analysis), and reliability (using test-retest and internal consistency) were performed on the inventory.

**RESULTS:** Initial pool of items was designed with 156 items, which were reduced to 93, following qualitative face validity, and further reduced to 80 after quantitative face validity (item impact score). No further reduction was implemented after qualitative and quantitative content validity (content validity ratio and content validity index ratio). Following construct validity (factor analysis), the remaining 80 items were summarized in 5 factors. Cronbach's alpha for the 5 factors was found 0.7, and correlation coefficient of test-retest results exceeded 0.9 and was significant at 0.01.

**CONCLUSION:** Given the acceptable results of psychometric features, this tool can be used as a valid and reliable tool for assessing life skills in military personnel.

## Keywords:

Inventory, life skills, military personnel, psychometrics

## Introduction

Today, despite profound cultural and lifestyle changes, many people lack basic skills needed for coping with life problems, which has made them vulnerable to everyday problems.<sup>[1]</sup> Life skills are a set of mental abilities that provide the context for positive adaptive coping and enable the individual to accept his social responsibilities and face everyday problems and expectations without harming himself or others.<sup>[2]</sup> Proper teaching of these skills enhances the individual and society,

protects human rights, and prevents mental and social health problems. Teaching these responsibilities improves cooperation and partnership, constructive interaction with people, verbal management and skill and self-confidence, and reduced arguments, verbal and nonverbal aggression, drug abuse, and many other harms.<sup>[3]</sup> According to extensive previous studies, life skill training program has proved beneficial in preventing drug abuse, sexual promiscuity, adolescence pregnancy, improving intelligence, preventing AIDS (WHO), peace education, and improving self-confidence.<sup>[4]</sup> Military profession is among highly stressful

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and complex jobs. Throughout the world, such jobs are associated with stress and physical hazards.<sup>[5,6]</sup>

Health of the armed forces (as a special population group) has always been of interest; yet, due to restricted publication of such data, there is little information about their health. Because of their particular type of job, missions and activities, and armed forces are exposed to various physical and mental stresses, and thus, health assessment is particularly important to maintain and improve their efficacy.<sup>[7]</sup>

Military families often suffer stress due to being away from normal living places, living in unfamiliar environments, and experiencing living away from their hometown. Furthermore, family problems reduce capabilities of military managers and increase odds of mental problems.<sup>[8]</sup> Stress of military service has dramatic consequences in the family environment.<sup>[5]</sup> Wives of military personnel show lower mental health due to their husband's difficult job, stress caused by husband's absence, heavy responsibility of family management, and instability of residence.<sup>[9]</sup> According to research, 34/1000 military pilots are at risk of mental health problems.<sup>[10]</sup> Common syndromes include anxiety (26%), marital conflicts (22%), somatization (15%), depression (13%), phobia (12%), and inappropriate behaviors (11%).<sup>[11]</sup> Mental health of military personnel is important because any problem in them or in their families prevents growth and development of the armed forces.<sup>[12]</sup> Thus, the present study aims to develop a valid and reliable tool for measuring life skills in military personnel.

## Materials and Methods

This is a mixed study, designed in two stages.

### Stage 1

Life skills of military personnel were redefined in a qualitative study using a three-stage hybrid concept analysis, consisting of theoretical stage (review of literature), field work (observation, interview) and final analysis. In theoretical stage, through a comprehensive review of articles, comparison, and highlighting definitions relevant to the main definition, a practical definition was obtained for entry into fieldwork. At this stage, characteristics, circumstances, and consequences are addressed. In field work, emphasis is on the experimental part of the process, and qualitative data are collected for further analysis of the concept. In the final analysis stage, theoretical findings are analyzed and reported according to the insight gathered in fieldwork observations, so that redefinition of the concept can be provided. Initial items and categories of the new tool are extracted according to theoretical, fieldwork, and final

analysis stages, leading to development of constructs of the tool.<sup>[13,14]</sup> Qualitative analysis of concept of life skills in military personnel provided the researcher with various themes for items of the inventory. A preliminary inventory was prepared according to these themes and review of literature, ready for psychometric stages.

### Stages 2

Following development of a pool of 156 items, psychometric assessment of the tool was performed. To determine face validity, 10 experts (in teaching life skills, tool assessment, military psychology, and nursing) and 10 people from the target group (military personnel) were asked to comment on completion of inventory, legibility, understandability, grammar, writing style, and modifications were made accordingly. To eliminate inappropriate items and determine the importance of each, quantitative item impact equation for each item was used separately as follows:

Impact score = frequency (%) × importance

With impact score >2, item was deemed appropriate for further analysis and was kept. To assess qualitative content validity, 15 experts were asked to comment on issues such as grammar, use of the right words, correct placement of items, and scoring. To assess quantitative content validity, content validity ratio and content validity index were measured. To determine content validity ratio, experts were asked to determine the necessity of each item, and numerical values obtained from content validity ratio equation were compared to Lawshe's table.

To measure content validity index, simplicity, relevance, and clarity were separately assessed for each item by experts using 4-point Likert Scale. Values of content validity index for all items  $\geq 0.79$  (as recommended by Hyrkäs *et al.*) were accepted. Exploratory factor analysis was used to determine construct validity. First, sample adequacy was assessed using Kaiser-Meyer-Olkin (KMO) test, and correlation matrix among items was determined by Kruit-Bartlett test. Reliability of the inventory was ensured using internal consistency with Cronbach's alpha, and stability reliability was determined using test-retest on 40 military personnel with a 2-week interval.

## Results

According to hybrid model, life skills in military personnel had the following characteristics of being cognitive, imperative, preventative, sociable, practical, able to be taught and learned, measurable, and dynamic. Five main themes of self-knowledge, relationship with others, thinking, decision-making and coping, and 42 secondary themes were identified for life skills.

Thus, an inventory with 156 items was prepared according to dimensions extracted from qualitative interviews with military personnel and review of literature. Following consultations and modifications, items were reduced to 143. Of the total number of items, 34 were extracted from relevant literature and 109 from qualitative interviews with military personnel. In the second (psychometric) stage, qualitative face validity was performed with experts and military personnel, and necessary eliminations and modifications were made, and the inventory entered quantitative face validity with 93 items. Experts comprised 10 people with the following qualifications: PhD in educational science majoring measurement and assessment, PhD in psychology majoring counseling, PhD in educational science with life skills teaching experience, PhD in psychology of military centers, and PhD in nursing. According to quantitative face validity results (item impact score) in two groups of experts (10 people) and military personnel (10 people), 13 items had impact score <2, and were eliminated, reducing the total number of items to 80.

Quantitative content validity was assessed in two parts of content validity ratio and content validity index. Minimum content validity ratio was found 0.75 and maximum 1, and according to Lawshe's table, minimum acceptable ratio for a panel of 15 is 0.49, which is less than that found for all items. Thus, no item was eliminated and number of items remained 80.

As for content validity index, percentage of points in favor of each item with third and fourth ranking (the highest scores) according to above equation was calculated, and results showed minimum values of 0.87 and maximum of 1 for this index, which exceeded acceptable value of 0.79.<sup>[15,16]</sup> Thus, all items were acceptable, and none were eliminated.

Mean content validity index for each of the criteria was as follows: relevance (0.945), simplicity (0.955), and clarity (0.945). To perform exploratory factor analysis to explore constructs of life skills and their reduction into significant factors, Kruit-Bartlett test was found significant (sig <0.01), and sample size adequacy was confirmed with KMO index of 0.82. According to exploratory factor analysis, the 80 items of the inventory were summarized first into 20 factors, and then into 5 [Table 1], including 1 – adaptive communication skill; 2 – cognitive-behavioral skill; 3 – goal setting skill; 4 – family-work balancing skill; and 5 – coping skill. These 5 factors were able to explain 62% variance of life skills construct. Eigenvalues in excess of 1 and factor loading above 0.4 are considered significant, and others are insignificant.<sup>[16]</sup> Accordingly, eigenvalues for the 5 factors were 5.94 for factor one, 2.67 for factor two, 1.52 for factor three, 1.2 for factor four, and 1.06 for factor

five. Explaining variance of life skills construct for each factor was 20.49% for factor one, 11.66% for factor two, 11.3% for factor three, 9.25% for factor four, and 9.19% for factor five, adding up to 62% of variance of life skill construct by all five factors.

Reliability of inventory was determined using internal consistency with Cronbach's alpha and test-retest. According to test-retest results, all dimensions were significant [Table 2], and the researcher-made inventory has favorable reliability.

Internal consistency was assessed using Cronbach's alpha, and according to table, reliability is confirmed ( $\alpha < 0.65$ ). Table 3 shows reliability of each factor according to Cronbach's alpha.

## Discussion

Nature and definition of life skills is different in different cultures and countries. Local and international studies on life skills have aimed to answer different questions. Researchers have used specific methods such as needs assessment to make an informed choice of life skills. Measuring life skills has been the principle concern of researchers,<sup>[17]</sup> but complexity of the concept and its various aspects has impeded making a standard measuring tool.<sup>[18]</sup> Thus, existing tools have been designed for specific people (such as AIDS patients or

**Table 1: Labeling extracted factors in factor analysis**

Factor	Name given to factor-based concept	Concepts contained in factor given questions
1	Adaptive communication skill	Self-confidence, coping with problems, legitimacy in decisions, and behaviors in difficult situations
2	Cognitive-behavioral skill	Communication balance, military behavior, and family relations based on religious beliefs
3	Goal setting skill	Logical skill, valuing others, progress-orientation, and autonomy in opinion
4	Family-work balancing skill	Valuing views, solving work problems, mutual understanding, overcoming difficulties, and behaviors in stress
5	Coping skill	Reducing anger, attention to feelings, acceptance by others, behavioral stability

**Table 2: Test-retest reliability results of 5-factor model inventory of life skills**

Order	Subscale	Test-retest reliability	Significance level
1	Adaptive communication skill	0.992	$P < 0.01$
2	Cognitive-behavioral skill	0.985	$P < 0.01$
3	Goal setting skill	0.978	$P < 0.01$
4	Family-work balancing skill	0.997	$P < 0.01$
5	Coping skill	0.971	$P < 0.01$

**Table 3: Cronbach's alpha reliability results for life skills inventory**

Row	Subscale title in life skills inventory	Cronbach's alpha reliability
1	Adaptive communication skill	0.84
2	Cognitive-behavioral skill	0.76
3	Goal setting skill	0.71
4	Family-work balancing skill	0.82
5	Coping skill	0.78

addicts) or for one or a few dimensions (for example, communication skill and coping with stress). Review of literature shows that despite the large number of research in this area; there is no method for measuring the concept of life skills, and existing methods are either inadequate or do not measure all aspects of life skills. None of the studies conducted in Iran have used a specific test for measuring life skills, which is probably due to the absence of valid tools. In the first life skills test by Kohlman, 17 life skills were measured in 5 areas using interviews, including self-care, safety and healthy, money management, transportation and telephone, and work and leisure.<sup>[19]</sup>

A study by Albertyn *et al.* shows that in personal efficiency in life, measuring 4 components of identifying life goals, problem-solving and decision-making, interpersonal relationships, and maintaining physical health are the most important of life skills.<sup>[20]</sup>

In the process of developing a "quality of life and professional skills" self-assessment questionnaire, Ventegodt *et al.* realized that the concept works according to theory of quality of life, which is a new finding for researchers. There are 4 areas in this theory, including quality of life, acquiring skills, fellowship, and generating real values. Five-point Likert scale was used in the self-assessment inventory according to 7 criteria of quality of working life from abstract to real situation. To design this inventory, subscales were first chosen according to the theory. To that end, 100 items were proposed in each area, and 20 of those that were the most relevant to philosophy of quality of working life were selected. Of the 500 relevant items collected through teamwork, 102 items were selected for 4 areas (approximately 25 for each) according to the least repeat, showing maximum picture of occupational position, and most significant relationship. Internal consistency was measured with Cronbach's alpha. External validity was found with correlation coefficient of self-assessment quality of life questionnaire. Reliability was ensured through test-retest. All these parameters were in acceptable range. The author concluded that the 100 items in 4 areas of quality of working life provide people with a feedback about their working life and areas that need improvement. As a personal profile,

such information can show a mental picture of quality of working life, and can be compared to employees in other jobs.<sup>[21]</sup>

In this study, a pool of 156 items was formed according to analysis of concept of life skills with hybrid method and qualitative analysis of interviews conducted with military personnel. It was then reduced to 80 items after performing qualitative and quantitative face and content validity stages. Exploratory factors analysis summarized 80 items first to 20 factors and then to 5.

The first factor in exploratory factor analysis was adaptive communication skill. Communication skill is known as predictor of adaptability<sup>[22]</sup> and a factor in family adaptation. Studies have shown that teaching communication skills is effective in marital adaptability.<sup>[23]</sup> Through United Nations Children's Fund communication skills training program (2004), researchers have shown that social adaptability of students can improve and they can be more successful in their relationships with friends.<sup>[24]</sup> Communication skills have also been proposed as a factor in academic adaptability and success.<sup>[25]</sup> Given background and importance of communication skills in creating adaptability, communication adaptability is considered one of the effective factors in life skills. According to the present study results, communication adaptability skill alone explains 20.49% of overall variance of life skills construct.

The second factor in exploratory factor analysis was cognitive-behavioral skill. Various studies have shown that this group of skills is associated with beneficial outcomes. Effectiveness of cognitive-behavioral skills has been demonstrated on attitudes, depression, and mood in addicts.<sup>[26]</sup> Researchers have shown that group cognitive-behavioral training is effective on mental health of women with disabled spouses. Results indicate that cognitive-behavioral training is effective in reducing fear of public speaking.<sup>[27]</sup> According to studies in the area of cognitive skills and its effectiveness and based on the present study results, cognitive-behavioral skill is one of the dimensions found in factor analysis, which explains 11.66% of variance of life skills construct alone.

The third factor in exploratory factor analysis was goal setting skill, which is a motivational factor in organizations.<sup>[28]</sup> Studies have shown that goal setting is a motivational factor in nurses.<sup>[29]</sup> Goals and goal setting are an effective factor in self-efficacy and academic matters,<sup>[30]</sup> so that individual's success in achieving goals creates a feeling of competence and capability and a sense of self-efficacy.<sup>[31]</sup> Researchers have shown that goal setting is significantly related to variables of satisfaction with life, vitality, and positive and negative emotions.<sup>[32]</sup>

Studies have shown that teaching goal management according to attribution styles improves self-efficacy in students,<sup>[33]</sup> and that type of goal affects individual's happiness.<sup>[34]</sup> This factor was able to explain 11.3% of overall variance of life skills construct.

The fourth factor in exploratory factor analysis was work-family balancing skill. According to studies, to achieve balance, the focus is on reducing conflicts. Everybody plays different roles in life, which may relate to family or work issues. Behaviors expected in a position can be defined as a person's role, and expectations associated with the role for those assuming that position are the same.<sup>[35]</sup> Role conflict arises when the individual is faced with two sets of contradictory demands and expectations; some relating to workplace and some to outside workplace. In fact, a person plays two or more conflicting roles. For example, an employee is asked to stay at work until late when he has to celebrate his wedding anniversary on the same night. Work-family conflict is in fact related to role conflicts,<sup>[36]</sup> and the resulting pressure from family and work demands is inconsistent and incompatible with roles.<sup>[37]</sup> Studies have shown that empowerment to reduce conflicts creates higher job satisfaction and enthusiasm.<sup>[38]</sup> According to the present study results, work-family balance is an effective life skill that explains 9.25% of overall variance of life skill construct.

The fifth factor in exploratory factor analysis was coping skills. These are cognitive and behavioral efforts to reduce pressure. Coping skills training has been proved effective in promoting mental and physical health and reducing behavioral and social problems in a population of students.<sup>[39]</sup> Researchers have shown that coping skills such as positive self-talk, generating self-hope, and pretending calmness are effective in reducing exam anxiety.<sup>[40]</sup> Weitlauf *et al.* in a study on the effect of coping skills on self-efficacy, assertiveness, and aggression in participants confirmed reducing effect of these skills on aggression and increasing effects on assertiveness and self-efficacy.<sup>[41]</sup> According to the present study results, this skill explains 9.19% of overall variance of life skills construct.

## Conclusion

Psychometric features of inventory of life skills in military personnel showed that the 156 items of the preliminary inventory were reduced to 80 through qualitative and quantitative face and content and construct validities, and reliability criteria were in the favorable range. Thus, this is a valid and reliable tool for measuring life skills, with applications in organizations, especially military organization, to assess efficacy of life skills interventions before and after intervention.

Furthermore, construct exploratory factors of this concept can be used in recruitment of workforce and job interviews. Other applications of the present study results include training packages for effectiveness of different organizational departments following identification of employee's needs. The results can also be used to prevent occupational pathology and increasing individual's job adjustment.

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## Conflicts of interest

There are no conflicts of interest.

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