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Development of Personal Safety and First Aid, Hygiene-Self-care, and Nutrition Subscales in Health Education Scale for Preschool Children

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Abstract

Aim of the research is to develop a scale to support the healthy development of preschool children's personal safety and first aid, hygiene and self-care, and nutrition supported in the light of detailed investigation and compilation of the programs of 5-6 year-old pre-school children and analyze reliability and validity of these subscales in Health Education Scale. In the research, SPSS 20.0 software package for Exploratory Factor Analysis, LISREL 8.71 software package Confirmatory Factor Analysis were used and Cronbach Alfa reliability coefficients of subscales found as ,95; ,93; ,94 respectively. Results of the analysis show that scale has best results in terms of validity and reliability.

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1. Introduction

There are certain steps and critical period in the development of individuals of all ages. These changes and developments are in a certain predictable period (Stuart and Prugh, 1964). Experiences in early ages affect the child's environment and determine their own skills and attitudes during the all life (MOE, 2013). In the years of physical health and personality structure are expected to develop in the same direction. In the researchers, it is observed that behaviors and skills acquired during childhood become a large part of the structure of an individual's personality,

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attitudes, habits and values into adulthood. In this regard, early childhood education is an important period affecting the future life of the children (Oktay, 2003).

Every individual is different each other and has a unique potential. Growth and development are very rapid in the early childhood education years and these years have a critical role for child to recognize himself/herself as well as the world and environment (Tuğrul and Duran, 2003). Supportive experiences in early years of children's life provide them to develop positive attitudes about their own skills. Negative experiences of the child at an early age to live the life that will affect his entire life can cause problems. The negative experiences can cause children to live with low self-confidence and have difficulties in later life (MOE, 2013). At this point, the people who care for children at an early age are important. These people are usually family and teachers at school.

UNICEF (United Nations International Children's Emergency Fund) states care; to support the children's survival, protection, growth and development with appropriate foods in a healthy way and physically healthy, clear-headed, safe, socially adequate and a safe environment for their learning (Taylor and Woods, 2005). Education is the most important tool to promote the health and prevent negativity in this century. Some campaigns and projects carry out with an emphasis on children's health while preventing disease in children with a complete wellbeing support. Health education affects directly to an individual's health and increases the quality of life. Throughout these education and projects, it is aimed all individuals benefit fully (Nutbeam, 2000).

Personal safety includes daily life attitudes and self-protection at home, at school, on the playground and in other environments, the communication with other individuals and events encountered in daily life against dangerous situations. All they might encounter in their daily lives and individuals could be exposed to such situations at any time and encounters with them to protect themselves. Early childhood education has a critical role to gain self-care skills and grow up healthy individuals and generations' providing their own security (Demiriz and Dinçer, 2000). To teach healthy and safety living skills begins in the early years of life which is the same period with early childhood education years (Kenny, 2011).

Self-care has an important role on the development of positive health behaviors, increasing the capacity of individuals and improving the quality of life (Yavuz and Lawn, 2007). Cleanliness is a personal matter and routine varies from person to person. Washing hands has an important role after using the toilet and before touching food in cleaning. At early ages, it should start to give information about cleaning and routine should be winning. Cleaning does not only occur in cases where pollution is considered; cleaning practices should be carried out continuously and regularly. When people get up in the morning, face washing, tooth brushing and regular bathing applications can be stated as basic example (Güler, 2004).

There are important roles of adults provide children to gain appropriate self-care habits such as eating, dressing-dressing, cleaning the toilet in the early ages. One of the self-care skills is nutrition habits occur at a very early age and develop over time. Eating habits gaining in early childhood period affect later period of the child's life and nutritional problems in early ages will be the basis of problems which can be arise later because nutrition has a crucial factor can affect child's physical, mental, emotional development and social behavior directly (Demiriz and Dinçer, 2000).

2. Method

In the research, Exploratory Factor Analysis was conducted using SPSS 20.0 software package; Confirmatory Factor Analysis was conducted using LISREL 8.71 to evaluate the validity of these three subscales of Health Education Scale. Items for this subscale were based on a review of the literature and the face validity of each item. Knowledge, skill and behavior of children were aimed to assess and rate on a 5-point Likert-type scale (from strongly disagree to strongly agree). The sample includes totally 733 parents whose children go to 26 different public and private schools. To assess reliability, measurements of internal consistency were calculated via Cronbach Alfa reliability coefficients for the subscale scores.

* This study is a part of 'Development of Health Education Scale for Preschool Children and Investigation in terms of Different Variables' presented as Master's Degree Thesis in Social Sciences Institute, Hacettepe University on 21 June, 2013.

2.1 Procedure

For each child in early childhood education centers, parents completed Health Education Scale for their child individually. In the pilot application, exploratory factor analysis was done with 456 data were obtained from the subscales containing a total of 86 items and 15 items were carried out not having enough item-total overload values and factor values. In the main application, to cross validate the factor structure identified through the EFA data from all children were derived to conduct confirmatory factor analysis with 277 data were obtained from the subscales containing a total of 71 items. Results of the analysis show that scale has best results in terms of validity and reliability.

2.2 Data Analysis

In the pilot application, to evaluate the factor structure of Health Education Scale, exploratory factor analyses (EFA) was conducted with 456 data. To assess the appropriateness of data set for explanatory factor analysis, creation of item-total correlation matrix and examination of correlation coefficients, Kraiser-Meyer-Olkin (KMO) test and Bartlett's Test of Sphericity were conducted (Peterson, Wahlquist and Bone, 2000). In the main application, confirmatory factor analyze (CFA) was conducted to test for data fit with 277 data. This study examined the factor structure of Health Education Scale and explored whether the three subscales—Personal Safety and First Aid, Hygiene and Self-care, Nutrition. To assess reliability, the estimates of internal consistency reliability were computed using standardized Cronbach's alpha coefficients. Scores obtained from the final 25-item Personal Safety and First Aid; 26-item Hygiene and Self-care and 20-item Nutrition subscales for all participants had alpha coefficients of .95; .93 and .94 respectively.

3. Findings and Discussion

3.1. Exploratory Factor Analysis Results

Data obtained from the pilot application were derived to conduct explanatory factor analyses. For the random samples, the statistics computed as follows:

3.1.1. Exploratory Factor Analysis Results of Personal Safety and First Aid Subscale

For this subscale, 30 items were written and after expert opinion, 33 items has been decided to put into application. To assess the appropriateness of data set for explanatory factor analysis, creation of item-total correlation matrix and examination of correlation coefficients, Kraiser-Meyer-Olkin (KMO) test and Bartlett's Test of Sphericity were conducted (Peterson, Wahlquist and Bone, 2000). When item-total correlation matrix was examined, it was seen that items in the subscale had correlation values between ,314 and ,689 and acceptance criteria value was determined as over ,50. Items 1, 2, 3, 5, 8, 32 and 33 were decided to remove because of the correlation values under ,50. KMO value of subscale was calculated as ,933 and this value indicates 'outstanding' (Sharma, 1996). Bartlett's Test of Sphericity value was found 6553,960 ($p < .01$) and this showed that factor can be removed from the correlation matrix (Şencan, 2005). After that, explanatory factor analysis was conducted with 26 items. Findings of first analyze showed that this subscale had five factors and respectively they had eigenvalue values as 10,751; 1,980; 1,240; 1,225 and 1,058; and interpreted 41,349%; 7,614%; 4,770%; 4,712% and 4,069% of cumulative variance. Accordingly, importance of the contribution of the first and the other four factor examined their contribution to the cumulative variance has decreased steadily and in such a case, number of the factors can be determined as one (Çokluk, Şekercioğlu and Büyüköztürk, 2010). After that, second analysis was conducted and findings showed that this subscale had one factor, eigenvalue value of it was 10,751 and the percentage of cumulative variance accounted for by one factor was 41,349% (Kalaycı, 2010). Also, inspection of scree plots suggested the extraction of more factors; however, after first factor, other factors were retained on the basis of parallel analysis and the eigenvalue rule. For this reason, number of the factor can be determined as one (Kalaycı,

2010). Pattern coefficients of greater than or equal to ,55 were used to determine which items were retained for individual factors (Comrey and Lee, 1992; cited in Çokluk, Şekercioğlu and Büyüköztürk, 2010). In the result of this analysis, factor value of item 4 was found under ,55 and removed from the subscale.

Finally, Personal Safety and First Aid Subscale consisted 25 items and one factor. The percent cumulative variance accounted for one factor 42,009% and eigenvalue value was 10,502.

3.1.2. *Exploratory Factor Analysis Results of Hygiene and Self-care Subscale*

For this subscale, 24 items were written and after expert opinion, 31 items has been decided to put into application. When item-total correlation matrix was examined, it was seen that items in the subscale had correlation values between ,469 and ,741 and acceptance criteria value was determined as over ,50. Item 31 was decided to remove because of the correlation values under ,50. KMO value of subscale was calculated as ,933 and this value indicates 'outstanding'. Bartlett's Test of Sphericity value was found 8232,700 ($p < ,01$) and this showed that factor can be removed from the correlation matrix. After that, explanatory factor analysis was conducted with 30 items. Findings of first analyze showed that this subscale had six factors and respectively they had eigenvalue values as 12,327; 2,087; 1,523; 1,426; 1,179 and 1,060; and interpreted 41,090%; 6,958%; 5,078%; 4,753%, 3,931% and 3,533% of cumulative variance. Accordingly, importance of the contribution of the first and the other five factor examined their contribution to the cumulative variance has decreased steadily and in such a case, number of the factors can be determined as one. After that, second analysis was conducted and findings showed that this subscale had one factor, eigenvalue value of it was 12,327 and the percentage of cumulative variance accounted for by one factor was 41,090%. Also, inspection of scree plots suggested the extraction of more factors; however, after first factor, other factors were retained on the basis of parallel analysis and the eigenvalue rule. For this reason, number of the factor can be determined as one. In the result of last analysis, factor values of items 2, 23, 27 and 30 were found under ,55 and removed from the subscale.

Finally, Hygiene and Self-care Subscale consisted 26 items and one factor. The percent cumulative variance accounted for one factor 43,266% and eigenvalue value was 11,249.

3.1.3 *Exploratory Factor Analysis Results of Nutrition Subscale*

For this subscale, 18 items were written and after expert opinion, 22 items has been decided to put into application. When item-total correlation matrix was examined, it was seen that items in the subscale had correlation values between ,069 and ,730 and acceptance criteria value was determined as over ,50. Items 13 and 20 were decided to remove because of the correlation values under ,50. KMO value of subscale was calculated as ,913 and this value indicates 'outstanding'. Bartlett's Test of Sphericity value was found 5657,193 ($p < ,01$) and this showed that factor can be removed from the correlation matrix. After that, explanatory factor analysis was conducted with 20 items. Findings of first analyze showed that this subscale had four factors and respectively they had eigenvalue values as 8,998; 1,835; 1,194 and 1,026; and interpreted 44,989%; 9,176%; 5,971% and 5,132% of cumulative variance. Accordingly, importance of the contribution of the first and the other three factor examined their contribution to the cumulative variance has decreased steadily and in such a case, number of the factors can be determined as one, eigenvalue value of this factor was 8,988 and the percentage of cumulative variance accounted for by one factor was 44,989%. Also, inspection of scree plots suggested the extraction of more factors; however, after first factor, other factors were retained on the basis of parallel analysis and the eigenvalue rule. For this reason, number of the factor can be determined as one. In the result of last analysis, factor values of all were found between ,56 and ,77 and no item was removed from the subscale.

Finally, Nutrition Subscale consisted 20 items and one factor. The percent cumulative variance accounted for one factor 44,989% and eigenvalue value was 8,998.

3.2. *Confirmatory Factor Analysis Results*

Data obtained from the main application were derived to conduct confirmatory factor analyses. For the random

samples, the fit statistics computed as follows:

Table 1. Confirmatory Factor Analysis Results of Subscales

Subscale	χ^2/Sd	RMSEA	NFI	NNFI	RMR	SRMR
Personal Safety and First Aid	4.2	0.07	0.91	0.92	0.056	0.073
Hygiene and Self-care	4.6	0.08	0.87	0.88	0.060	0.079
Nutrition	4.7	0.08	0.86	0.86	0.011	0.064

3.2.1. Confirmatory Factor Analysis Results of Personal Safety and First Aid Subscale

In the result the explanatory factor analysis, this subscale had 25 items in one factor. For the main application, confirmatory factor analyses were conducted to test for data fit. The following fit indices were examined: Chi-Square Goodness of Fit (χ^2) was found (1157.41/275)= 4.2 respectively ($p = 0.01$) and this score on the fit indicates was above cutoff level (Özdamar, 2002; Sümer, 2000). Root Mean Square Error of Approximation (RMSEA) was found 0.07 for this subscale and it was on the fit indices (Jöreskog and Sörbom, 1993); Normed Fit Index (NFI) was found 0.91; Non-normed Fit Index (NNFI) was found 0.92 and these scores on the fit indices were above cutoff levels (Sümer, 2000; Tabachnick and Fidell, 2001; cited in Çokluk, Şekercioğlu and Büyüköztürk, 2010). Root Mean Square Residuals (RMR) was found 0.056 and Standardized Root Mean Square Residuals (SRMR) was found 0.073 and these scores on the fit indices were above cutoff levels (Byrne, 1994; Kline, 2005; Brown, 2006; Tabachnick and Fidell, 2001; cited in Çokluk, Şekercioğlu and Büyüköztürk, 2010). For the factor models described above, all scores on the fit indices were near or above cutoff levels, thereby indicating an adequate fit of the data.

3.2.2. Confirmatory Factor Analysis Results of Hygiene and Self-care Subscale.

In the result the explanatory factor analysis, this subscale had 26 items in one factor. For the main application, confirmatory factor analyses were conducted to test for data fit. The following fit indices were examined: Chi-Square Goodness of Fit, χ^2 was found (1387.69/299)= 4.6 respectively ($p = 0.01$) and this score on the fit indicates was above cutoff level RMSEA was found 0.08 for this subscale and this score was on the fit indices near cutoff level; NFI was found 0.87; NNFI was found 0.88 and these scores on the fit indices were above cutoff levels. RMR was found 0.060 and SRMR was found 0.079 and these scores on the fit indices were above cutoff levels. For the factor models described above, all scores on the fit indices were near or above cutoff levels, thereby indicating an adequate fit of the data.

3.2.3. Confirmatory Factor Analysis Results of Nutrition Subscale.

In the result the explanatory factor analysis, this subscale had 20 items in one factor. For the main application, confirmatory factor analyses were conducted to test for data fit. The following fit indices were examined: Chi-Square Goodness of Fit, χ^2 was found (899.69/190)= 4.7 respectively ($p = 0.01$) and this score on the fit indicates was above cutoff level RMSEA was found 0.08 for this subscale and this score was on the fit indices near cutoff level; NFI was found 0.86; NNFI was found 0.86 and these scores on the fit indices were above cutoff levels. RMR was found 0.011 and SRMR was found 0.064 and these scores on the fit indices were above cutoff levels. For the factor models described above, all scores on the fit indices were near or above cutoff levels, thereby indicating an adequate fit of the data.

3.3. Internal Consistency Analysis Results

3.3.1. Internal Consistency Results of the Subscales.

To assess reliability, the estimates of internal consistency reliability were computed using standardized Cronbach's alpha coefficients. The Cronbach alpha values were found as ,95 for personal safety and first aid; ,93 for hygiene and self-care; and ,94 for nutrition in turn and all subscales are up to the mark (Kalaycı, 2010).

4. Conclusion and Suggestions

This study aimed to examine the factor structure and reliability of the subscales of Health Education Scale. Specifically, it examines the validity and the factor structure of the scores, and it evaluates the internal consistency of the subscale scores. In the pilot application, exploratory factor analysis was done with 456 data were obtained from the subscales containing a total of 86 items and 15 items were carried out not having enough item-total overload values and factor values. In the main application, to cross validate the factor structure identified through the EFA data from all children were derived to conduct confirmatory factor analysis with 277 data were obtained from the subscales containing a total of 71 items. Consequently, the Health Education Scale tested in this study included totally 71 items rated on 5-point scale. To assess reliability, the estimates of internal consistency reliability were computed using standardized Cronbach's alpha coefficients. Scores obtained from the final 25-item Personal Safety and First Aid; 26-item Hygiene and Self-care and 20-item Nutrition subscales for all participants had alpha coefficients of .95; .93 and .94 respectively. Taken together, the results of the current study suggest that the Health Education Scale is a valid, stable, and reliable measure for diverse samples of preschool children. These findings suggest that the Health Education Scale may be a viable and cost-effective alternative to other commonly used parent-reported measures of children's knowledge, skill and behavior. As such, it may be useful for program evaluators and researchers who are interested in using a valid, reliable, and efficient method for assessing change in child knowledge, skill and behaviors.

In the light of these conclusions, in order to improve the children's knowledge and skills, different programs can be developed and parents and teachers can be a part of these programs. Parent involvement is a crucial part of early childhood education and their role cannot be ignored. Besides, personal safety and first aid; hygiene and self-care; and nutrition have crucial importance for individual's and especially special need children's life and different programs and curriculums can be applied, to provide them to gain these basic knowledge and skills. In today's world, media and internet are in a rapid growth and educators and early childhood educators can benefit from its power. They can prepare different videos and short films collaboratively to inform the children, parents and early childhood educators.

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