

Abstract

Nutrition literacy is defined as the degree to which individuals have the capacity to obtain, process, and understand nutrition information needed to make appropriate dietary decisions. Literacy encompasses a wide range of skills, from the ability to apply basic literacy skills in reading, writing and calculations in everyday health decision making, to the ability to apply more advanced literacy skills to independently obtain relevant information, to derive their meaning and to critical analyse the obtained information.

A few attempts had been made globally to assess level of nutrition literacy. Tests that have been used were not comprehensive to assess all the facets of the construct of nutrition literacy. The body of literature amply emphasizes the importance of the nutrition literacy among adult females in view of the importance of their own nutritional status and their role in uplifting the nutritional status of their children and other family members. No research has been conducted in Sri Lanka to assess nutrition literacy among adult females.

With this background the present research aimed to determine prevalence and correlates of inadequate nutrition literacy among females aged 25-45 years in district of Colombo and to design, implement and assess the effectiveness of a skill development intervention to improve nutrition literacy of females aged 25-45 years in the district of Colombo.

The study comprised three components. First component was development and validation of a test to assess nutrition literacy among females aged 25-45 years in district of Colombo. Second component was a descriptive cross-sectional study to determine the prevalence of inadequate nutrition literacy and correlates for inadequate nutrition literacy among the said study population. Third component was to design a skill development intervention package to improve nutrition literacy skills of females and to implement a cluster randomized trial to assess the effectiveness of the designed intervention.

The test that was developed in the present study to assess nutrition literacy among adult females was named, Nutrition Literacy Test. It comprised 30 single best answers multiple choice questions to elicit the different skills required for one to be nutritionally literate. The test was designed to be completed by the respondents and it did not specify a time limitation.

The development of the Nutrition Literacy Test was a stepwise process which involved a triangulation of quantitative and qualitative methods. The test was also adjusted to Grade 8 reading level to ensure its applicability to a majority of females in the Sri Lankan setting. Following development of the draft test a validation study was conducted to assess the validity and reliability of the test. The validation study included a detailed item analyses to assess the item-total correlation, Item difficulty index, Item discrimination index, inspection of the item characteristic curve, distractor analysis and a reliability analysis and an assessment of convergent validity. Establishment of the cut off score for the Nutrition Literacy Test was using multi Receiver Operating Curves.

Second component of the present study was a descriptive cross-sectional study to determine the prevalence of inadequate nutrition literacy and correlates for inadequate nutrition literacy among females aged 25-45 years in district of Colombo. A sample of 1220 females were selected using a multi stage cluster sampling with probability proportionate to the number of females aged 25-45 years from all the 13 divisional secretary (DS) divisions of the district of Colombo. A total of 43 clusters were included in study, and cluster size was thirty. Study units were recruited in a household survey. Validated Nutrition Literacy Test was used to assess nutrition literacy while an interviewer administered questionnaire was used to obtain information on correlates of nutrition literacy. Two trained female pre-intern medical officers collected data under supervision of the principal investigator.

In the third component to design a skill development intervention package to improve nutrition literacy of adult females, many steps were taken to design an educationally sound and culturally appropriate skill development intervention.

Principles of development of educational material were followed and the package comprising two training modules and supplementary teaching material were developed and pilot tested. A facilitator with expertise in the field of nutrition was selected and was trained to deliver the package uniformly. Effectiveness of the intervention was assessed using a cluster randomized trial to assess the effectiveness of the intervention. A grama niladhari area was defined as a cluster and as indicated by the sample size calculation, a total of 24 clusters which are situated geographically apart from each other from two DS divisions of the Colombo district were randomly selected to be included in the study. The selected clusters were randomly assigned the intervention and control status. From each cluster 10 females of 25-45 years of age were selected as the study units. Nutrition literacy assessed using the Nutrition Literacy Test was used as the outcome indicator of the success of intervention.

The study and control participants were recruited in a household visit where the pre intervention assessment was conducted by the same data collectors as in Component 2. The intervention was then delivered to females in intervention group, in groups of 10 in two sessions. Six months after the intervention the post intervention assessment was conducted using the same data collectors and the same study instruments.

The results of the validation test indicated that the Nutrition Literacy Test was a valid and reliable test to assess nutrition literacy.

Item total correlations of all items were satisfactory as the values were 0.3 or more for all items. Item difficulty ranged from 0.2-0.9 and the point biserial correlations were above +0.20 for all items. These results confirmed that all the items in the test were appropriate to be retained.

None of the item characteristic curves were flat and all distractors were sufficiently efficient and none of the items were found to be ambiguous or confusing. Item characteristic curves were found to be satisfactory for all items. The test also demonstrated adequate internal consistency as per KR-20 coefficient of 0.913, which were greater than 0.9 which indicate excellent reliability.

Assessment of convergent validity found that high nutrition literacy scores assessed by the Nutrition Literacy Test converged with high use of material on nutrition and high education level.

Based on the findings of multi ROCs, lower cut off offered a sensitivity of 97% and specificity of 95% and the upper cut off score, sensitivity, 100% and specificity 98%.

The present study found that the prevalence of adequate nutrition literacy among females aged 25-45 years in Colombo district to be 44.3% (95% CI 40.2-48.5). The prevalence of marginal and poor nutrition literacy level were 41.2% (95% CI 36.8-45.4) and 14.6% (95% CI 9.4-19.8), respectively.

Prevalence of adequate nutrition literacy level gradually increases with the increasing level of education. Adequate nutrition literacy also showed a gradually increasing trend with increasing wealth quintile.

Multivariate analyses revealed that two socio economic correlates were significant correlates of inadequate nutrition literacy when adjusted for effects of confounding. They were having an education level below G.C.F. A/L (adjusted OR= 2.43(95%CI1.81-3.27) and not being employed (adjusted OR=1.58(95%CI1.13-2.21).

Involvement in household food purchasing for more than 4 days per week (adjusted OR 1.63 (95%CI 1.19-2.23)), non-receipt of formal education on nutrition related fields up to G.C.E. O/L (adjusted OR 1.58 (95%CI1.15-2.19)), not using of television to obtain nutrition information during the past six months (adjusted OR=2.47(95%CI1.37-4.43), not using of newspapers to obtain nutrition information during the past six months (adjusted OR=2.90 (95%CI 1.96-4.28)) and possessing low level of nutrition knowledge (adjusted OR=2.18 (95%CI1.66-2.87)) were the other correlates that were found to be significant

correlates of inadequate nutrition literacy when adjusted for effects of confounding.

In the cluster randomized trial, the findings showed that the intervention and the control groups were comparable based on selected socio demographic parameters and in levels of nutrition literacy of the study units.

Six months after completion of the intervention, at the post intervention assessment, proportion of study units with inadequate nutrition literacy level had significantly decreased in the intervention group ($p < 0.001$) but not in the control group ($p = 0.061$). Furthermore, the difference in the intervention group and the control group in the post intervention assessment was also significantly different ($p < 0.001$), indicating that the intervention was effective at individual level.

The present study also found that the intervention was effective in improving nutrition literacy level at any age group ($p = 0.760$) of the study units. The intervention was also effective in improving each of the skills related to nutrition literacy.

Comparison of cluster level proportion of the participants with inadequate nutrition literacy level in the intervention clusters between pre and post intervention assessments showed that the proportion of the participants with inadequate nutrition literacy in the intervention clusters had significantly decreased while the corresponding difference in the control clusters was not significant, indicating that the intervention was effective at cluster level. The present study also generated evidence that the females of 25-45 years old who underwent the intervention accepted the interventional activities well and perceived that participating in the study benefitted them.

The study concluded that inadequate nutrition literacy was a considerable problem among females aged 25-45 years in Colombo district. The prevalence of inadequate nutrition literacy was seen to be higher among low educated and poor. Correlates of inadequate nutrition literacy identified were mostly modifiable

factors.

The intervention developed and implemented to improve nutrition literacy skills of the study population was found to be successful in improving nutrition literacy among adult females of 25-45 years in Colombo district. The intervention was proved to be effective in improving nutrition literacy both at individual and at group level.

The study recommends that the problem of inadequate nutrition literacy among females should be brought to the notice of the relevant authorities and that they should be lobbied to consider implementing the intervention to improve nutrition literacy, which was found to be effective and acceptable in the present study, to improve nutrition literacy skills of adult females.

Key words: nutrition literacy, correlates of nutrition literacy, female, prevalence, nutrition literacy skills