ABSTRACT

Introduction

Health literacy (HL) is a key social determinant of health, recognised by the Shanghai Declaration as a key pillar of health promotion. It is central to behaviour change, as noted in the Calgary Charter. Populations with lower socioeconomic status often face higher behavioural risk factors for non-communicable diseases (NCDs) and lower HL. Sri Lanka faces the challenge of these intertwined issues as a lower-middle-income country. Healthcare Assistants (HCAs), with their close patient contact, can drive change but often have low HL and high NCD risk factors themselves. Improving HL among HCAs in Sri Lanka is crucial in reducing NCD risk factors and enhancing community health outcomes.

Objectives

This study aimed to assess the effectiveness of a behaviour change intervention package to improve HL on behavioural risk factors of NCDs among HCAs in Colombo district.

Methods

The study consisted of three components.

Component I

The HL-NCD tool to assess the level of HL was developed and validated in three phases: item development; scale development; and scale evaluation. The items were developed in seven stages. The factor structure was identified based on Principle Component Analysis (PCA) using a cross-sectional validation study among 280 HCAs, aged 18-55 years in selected hospitals in Gampaha district. The dimensionality of the identified factor structure was assessed through Confirmatory Factor Analysis (CFA) using a similar cross-sectional validation study (n=280). The convergent validity was assessed against the validated FFQ, the validated GPAQ, and the STEPS questionnaire using Spearman’s rank correlations. The reliability was assessed using internal consistency and test-retest reliability.

Component II

The BCIP to enhance HL and reduce behavioural risk factors of NCDs among HCAs was developed based on the steps of Intervention Mapping: logic model of the problem assessment; setting objectives; intervention design; content validation and pilot testing; implementation planning; and evaluation planning. The curriculum focused on understanding the concept of HL and its domains based on the Calgary Charter, addressing specific behavioural risk factors of NCDs, and behaviour change through improved HL, sustaining behaviour change and applying HL to other life aspects.

Component III

A cluster Randomized Controlled Trial (cRCT) was conducted among 240 HCAs from 20 hospitals in the Colombo district, 10 hospitals each for the control and intervention arms to reduce contamination. The 16 sessions of the BCIP were conducted over eight weeks. The HL-NCD tool and STEPS questionnaire were administered two weeks before and after the intervention. The primary outcomes: HL score and level of HL and secondary outcomes: diet, physical activity, tobacco use, and alcohol intake were assessed and underwent unadjusted analysis, cluster-level analysis, and multivariate analysis controlling for clustering effect and confounding variables using Generalized Estimating Equations (GEE).

Results

Component I

The HL-NCD tool had 56 items, all with communalities above 0.5. Four underlying factors; skills of finding the standards, finding the self-practice, comparing standards with self-practice and applying in daily life accounted for 92.49% of the variance. All items loaded to one of the four factors, with factor loadings above 0.4. The four-factor model confirmed fit with Chi-Square=1499.7, p=0.34, RMSEA=0.0072, CFI=0.99, SRMR=0.026, PGFI=0.78, PNFI=0.95, and NNFI=0.99. Convergent validity was established using Spearman rho values for the relevant behavioural measures: dietary practice (ρ=0.512), physical activity (ρ=0.433), tobacco use (ρ=0.584), and alcohol intake (ρ=0.467). The tool demonstrated high internal consistency (α=0.901), test-retest reliability (ICC=0.836) and excellent acceptability, with a 100% response and completion rate.

Component II

The BCIP composed of a curriculum, facilitator guide, handbook for participants, and Powerpoint Presentations. Content validity and pilot testing confirmed the content. The implementation plan for the BCIP spanned across eight weeks (two 2-hour sessions per week) and the evaluation plan comprised process and outcome indicators.

Component III

The intervention group showed significant increments in HL scores in unadjusted ($p<0.001$, effect-size=0.851), cluster level ($p=0.005$, effect-size=0.886) and GEE ($\beta=7.801$,95%CI:7.378-8.224, $p<0.001$) analyses. Significant improvements were also noted in HL level in unadjusted ($p=0.003$), cluster level ($p=0.011$) and GEE analyses (OR=3.8, 95%CI: 1.585-9.113, $p=0.003$). GEE analysis identified age <35 years as a significant positive predictor of HL score ($\beta=1.109$, 95%CI: 0.401-1.817, $p=0.002$) and educated only up to O/Ls as a significant negative predictor of HL level (OR=0.465, 95%CI: 0.267-0.807, $p=0.007$).

All the secondary outcomes except fruit intake and smoking tobacco showed significant improvements in the intervention group in unadjusted analysis and cluster-level analysis. The GEE analysis revealed significant improvement in behaviour change in sugar intake (OR=12.346,95%CI:4.270-35.701,$p=0.000$), salt intake (OR=9.423, 95%CI:4.538-19.569, $p=0.000$), fruit intake (OR=9.154, 95%CI:1.295-64.717, $p=0.026$),vegetable intake (OR=5.053,95%CI:2.466-10.354,$p=0.000$), physical activity(OR=5.827,95%CI: 3.222- 0.537, $p=0.000$), active mode of transport(OR=5.439, 95%CI:2.336-12.663, $p=0.000$), not using smokeless tobacco(OR=2.704, 95%CI:1.152-6.350,$p=0.022$),and non-exposure to secondhand smoking(OR=46.718, 95%CI:8.091-269.745,$p=0.000$). The improvements in avoiding smoking tobacco (OR=1.634, 95%CI:0.611-4.478, $p=0.322$) and avoiding alcohol intake(OR=1.889, 95%CI:0.401-8.898, $p=0.421$), were not statistically significant. Integrating HL into community health initiatives can effectively drive behaviour change, particularly concerning NCDs, while sustained improvements rely on ongoing, long-term support.

Conclusions and Recommendations:

The HL-NCD is a valid, reliable and an effective tool to screen low HL on behavioural risk factors of NCDs among HCAs. The BCIP was effective in improving HL and reducing behavioural risk factors of NCDs of HCAs. It is recommended to adapt the HL-NCD tool for other populations and settings. The BCIP can be incorporated into the training of HCAs and modify it for other populations.

Keywords: **health literacy, behavioural risk factors of non-communicable diseases, behaviour change intervention, cluster randomized controlled trial.**