THE INTERNAL CONSISTENCY OF A TOOL TO ASSESS THE TRAINING NEEDS OF HEALTHCARE ASSISTANTS IN STATE HOSPITALS OF SRI LANKA

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Abstract

Introduction: *Two tailor-made tools were developed to assess the training needs of HCAs working in clinical and office settings of state hospitals in Sri Lanka. The items of the tools were measured on an interval scale. The average mean scores of tools were computed and served as threshold values for prioritizing the training needs. Such an approach necessitates the assessment of the internal consistency of tools to assume the items are strongly correlated.*

Objective: *The study aimed to assess the internal consistency of tools in identifying the training needs of healthcare assistants working in clinical and office settings of state hospitals in Sri Lanka.*

Method: *Tools were piloted among the middle-level managers at NHSL in July 2023. The survey results were scrutinized by statistical tests for internal consistency (reliability). Cronbach's alpha correlation coefficient testing was the mainstay of analysis with the support of Principal Component Analysis, intraclass correlation coefficient, and split-half reliability testing.*

Results: *The Cronbach's Alpha correlation coefficients with 95% CIs were 0.963 (0.945 - 0.976)) and 0.945 (0.913 - 0.969) respectively for clinical and office setting tools. The split-half reliability tests done on office and clinical setting tools showed Spearman-Brown coefficients of 0.885 and 0.930 respectively.*

Conclusion: *Both tools were found stable (reliable) to measure the training needs of HCAs working in state hospitals of Sri Lanka.*

Recommendation*: The developed tools could be used in any hospital under the Ministry of Health, Sri Lanka.*

Keywords: *Internal consistency of tools, training needs assessment, healthcare assistants, state hospitals, Sri Lanka*

1. Introduction

1.1. Training in human resource development

The effectiveness of human resource management determines the success or failure of an organization. Employees who develop as competent are the drivers of organizations in achieving their objectives [1]. The performance of healthcare systems heavily depends on the knowledge, skills, and motivation of the people delivering services [2]. Properly managed human resources play a pivotal role in providing high-quality healthcare services that yield better outcomes [3].

Training is recognized to be a critical component of human resource management, as they clinch competitive advantage to organizations when training programs are sustainable and in compliance with changing environments [4]. Training and developing healthcare staff to improve their knowledge and skills positively impacted employees' performance and work motivation, ultimately benefiting the organizations [5].

1.2. Healthcare assistants

"*Healthcare assistants provide routine personal care, support, and assistance with activities of daily living to patients and residents in various healthcare settings. They assist patients with personal, physical mobility, and therapeutic care needs as per established care plans and practices, and generally under the direct supervision of medical, nursing, or other health professionals or associate professionals*"[6].

The tasks undertaken by HCAs are multifaceted and expand from the provision of fundamental patient care (e.g. nutrition, mobilization, hygiene, comfort, toileting) to social and emotional support and assistance in; administrative processes, sterilization of instruments, administration of medications, vital sign observations, wound dressings, venepuncture, ECG recording, spirometry, lung function testing, etc [7].

1.3. Training of healthcare assistants

Education and training for healthcare assistants (HCAs) were long neglected, as it perceived to be unnecessary. However, the contribution of HCAs to the healthcare system is exponentially increasing and is found to be a major determinant of patient experience during care provision [8]. It studied that HCAs enjoyed and gained from training programs designed for them [8]. Being untrained and unregistered frontline staff, training interventions among HCAs are expected to inculcate fruitful benefits in care outcomes [9].

1.4. Training needs of healthcare assistants

"*Training needs analysis is an activity that needs to be carried out systematically to find any gaps between the knowledge, skills, and attitudes of a person needed by the organization that can be improved through training. This behavioural needs analysis will later assist the organization in using resources effectively and prevent unnecessary training activities*" [10].

A UK study was conducted to learn the training needs of HCAs from themselves and their managers. They found HCAs need training in areas under the broad topics of physiological/ biochemical knowledge and data handling [11]. Another UK study [12] emphasized improvements in the training of healthcare assistants, based on the views of HCAs and their managers.

1.5. State hospitals in Sri Lanka

There were 1127 state hospitals under the Ministry of Health, Sri Lanka [13], employing nearly 40,000 healthcare assistants [14].

1.6. Internal consistency of a tool

It refers to the consistency of people's responses across the items on a multiple-item measure (or a tool). In general, all the items on such measures are supposed to reflect the same underlying construct, so people's scores on those items should be correlated with each other [15]. Internal consistency is the extent to which a group of items measures the same construct, as evidenced by how well they vary together or intercorrelate [16].

1.7. Research problem

The blurred roles and responsibilities characteristic of HCA jobs all over the world emphasize context-specific analysis of their training needs. In Sri Lanka, there is no standard tool to evaluate the training needs of HCAs employed in state hospitals. The absence of a standard tool hinders a rational and systematic approach to identifying the training needs of HCAs for effective and sustainable training cycles.

Therefore, a training needs assessment tool was developed by modifying Hennessey-Hick's Training Needs Assessment Tool, which includes 14 common training needs components for HCAs working in clinical and office settings and nine additional components (a total of 23 components) for clinical settings. It was validated (face and content validity) by literature and expert review. The tools ask managers to rate how important each component for healthcare services (least important to extremely important) and how well HCAs possess/perform them currently (extremely poor to extremely good), on 10-point continuous numerical rating scales. The differences between the importance of training need components and the possession/performance by HCAs on particular components were the perceived gaps of managers for interventions in the form of training. The overall mean values of perceived gaps of each set (office/clinical) were selected as threshold values to demarcate the highly prioritized and less prioritized training needs of HCAs.

Such an approach provides the same weight to each component and the components together need to act as a single unit to determine the training needs. To operationalize the particular methodology, the internal consistency of the tool has to be verified.

1.8. Objective

The objective of the study was to assess the internal consistency of tools in identifying the training needs of healthcare assistants working in clinical and office settings of state hospitals in Sri Lanka.

2. Methods

It was a descriptive survey piloted at the National Hospital of Sri Lanka, Colombo in July 2023 among middle-level managers in the categories of Nursing, Radiography, Medical Laboratory Technology, Physiotherapy, Accounting, and Administration. 55 clinical managers and 35 non-clinic managers responded. The collected data was processed and analyzed with the assistance of the SPSS 25 computer software package. Descriptive statistics applied for data analysis and presentation. Statistical tests were done to check the internal consistency (reliability) of the tools used. The Principal Component Analysis was performed before the estimation of Cronbach's alpha correlation coefficient. The overall Cronbach's alpha of the tool was presented with an interval calculated by the intraclass correlation coefficient (ICC) method. The alpha values were repeatedly measured and compared with the overall value by deleting each item in the tools one by one. The split-half correlation coefficient also was done.

3. Results

3.1. Training needs of HCAs

The training needs (performance gaps) based on the perception of managers were identified (Table 1).

Table 1: The training needs (performance gap) of HCAs working in clinical and office settings at NHSL

Training needs component	Performance gap (mean, SD)	
	Office setting	Clinical setting
Time management	**3.54(2.15)**	**5.25(2.43)**
Knowledge of E-code (E.g. leaves)	**3.57(3.07)**	**5.23(2.68)**
Maintaining self-discipline	2.89(2.49)	**4.44(2.38)**
Conflict management	**3.57(2.06)**	**4.28(2.31)**
Assisting in quality improvement activities	**3.69(2.30)**	**4.20(2.34)**
Knowledge of hospital administrative procedures	2.29(2.54)	**4.19(2.47)**
Identifying the importance and priority of work	**3.60(2.32)**	**4.11(2.40)**
Knowledge of sterile procedures	-	**3.87(2.34)**
Teamwork and sharing duties	**3.37(2.18)**	**3.87(2.84)**
Knowledge of infection control/waste management	-	**3.80(1.97)**
Keep the workplace clean	**3.74(2.12)**	**3.76(2.19)**
Communication with patients and staff	2.77(2.41)	**3.67(2.00)**
Safe handling of equipment	2.46(2.40)	3.35(1.93)
Assisting to patients	-	3.26(2.26)
Assisting the staff at work	2.35(2.04)	3.20(2.23)
Safe and responsible transporting of patients	-	3.19(1.96)
Assisting during emergencies	-	3.17(2.28)
Handling violent patients/visitors	-	3.04(1.97)
Knowledge of hospital units and their activities	2.40(2.37)	2.96(1.99)

Cleaning of surgical instruments	-	2.87(2.08)
Safe possession and responsible handling of clinical/general documents and ledgers (E.g. BHT)	2.29(2.30)	2.85(2.00)
Safe and responsible collection and transporting of pathology samples, blood, pharmaceuticals, etc.	-	2.60(1.80)
Safe and responsible collection, transportation, and distribution of hospital diets	-	2.58(1.90)
Overall	**3.04 (1.79)**	**3.64 (1.65)**

*The item scores higher than the overall scores are in bold.

3.2. Reliability of the tools

3.2.1. Principal Component Analysis

The principal component analysis revealed that 12 items in the clinical setting tool and 7 items in the office setting tool had factor loading above 0.8. Knowledge of hospital units and their activities was the only item that had a factor loading less than 0.5 in the clinical setting tool (0.343), however, it had a loading of 0.848 in the office setting tool (Table 2). Anyhow the component was retained for further evaluation. The first component of the clinical setting stool had the Eigenvalue of 12.9 and added 56% of the total variance. The first component of the office setting stool had an Eigenvalue of 10.8 and added 60% of the total variance.

Table 2: Results of Principle Component Analysis on clinical and office setting tools

Training needs component	Factor loading	
	Office setting	Clinical setting
Keep the workplace clean	0.674	0.768
Assisting the staff at work	0.764	0.785
Assisting the patients	-	0.788
Safe transporting of patients	-	0.767
Safe and responsible collection and transporting of pathology samples, blood, pharmaceuticals, etc.	-	0.805
Safe possession and responsible handling of documents and ledgers	0.808	0.762
Safe and responsible collection, transportation, and distribution of hospital diets	-	0.746
Cleaning of surgical instruments	-	0.773
Safe handling of equipment	0.829	0.780
Handling violent patients/visitors	-	0.614
Assisting during emergencies	-	0.662
Knowledge of sterile procedures	-	0.757
Knowledge of infection control/waste management	-	0.640
Knowledge of E-code	0.813	0.594
Knowledge of hospital administrative procedures	0.898	0.726

Knowledge of hospital units and their activities	0.848	0.343
Communication with patients and staff	0.796	0.801
Maintaining self-discipline	0.772	0.882
Conflict management	0.541	0.804
Teamwork and sharing duties	0.791	0.879
Identifying the importance and priority of work	0.806	0.830
Assisting in quality improvement activities	0.813	0.852
Time management	0.791	0.790

3.2.2. Cronbach's alpha correlation coefficient

Thus, overall Cronbach's Alpha was calculated to be 0.963 and 0.945, respectively for office and clinic setting tools. The intraclass coefficients (ICC) tested for a 95% confidence interval by following the two-way mixed model and the consistency type. The resultant Cronbach's Alphas with 95% CIs were 0.963 (0.945 - 0.976)) and 0.945 (0.913 - 0.969). When Cronbach's alpha was run by deleting items one by one, little changes were observed from the overall alpha values of both tools (Table 3).

Table 3: Cronbach's alpha values for clinical and office setting tools

Description of the test	Cronbach's alpha	
	Clinical setting	Office setting
Overall	0.963	0.945
Following the deletion of 1st item	0.960	0.941
Following the deletion of 2nd item	0.959	0.938
Following the deletion of 3rd item	0.958	0.934
Following the deletion of 4th item	0.955	0.932
Following the deletion of 5th item	0.954	0.928
Following the deletion of 6th item	0.953	0.935
Following the deletion of 7th item	0.955	0.931
Following the deletion of the 8th item	0.954	0.926
Following the deletion of the 9th item	0.953	0.918
Following the deletion of the 10th item	0.951	0.931
Following the deletion of the 11th item	0.950	0.916
Following the deletion of the 12th item	0.947	0.872
Following the deletion of the 13th item	0.944	-
Following the deletion of the 14th item	0.942	-
Following the deletion of the 15th item	0.946	-
Following the deletion of the 16th item	0.958	-
Following the deletion of the 17th item	0.953	-
Following the deletion of the 18th item	0.939	-
Following the deletion of the 19th item	0.929	-
Following the deletion of the 20th item	0.918	-
Following the deletion of the 21st item	0.909	-

3.2.3. Split-half reliability test

The split-half reliability tests done on office and clinical setting tools showed Spearman-Brown coefficients of 0.885 and 0.930 respectively.

4. Discussion

4.1. Methods and findings

Reliability checks are more valid when the sample size is high. Many studies suggest to have a minimum of 100 samples for reliability studies [17]. The adequacy of samples could be reflected by the variation in Cronbach's

alpha correlation coefficient. Therefore, it's more scientific to report reliability as an interval estimate instead of a point estimate [17]. The intraclass correlation coefficient (ICC) index is used to measure the confidence intervals of reliability tests like Cronbach's alpha and test-retest reliability [18]. Another way to determine the appropriateness of measuring Cronbach's alpha with smaller samples is to decide the appropriateness of items included in the tool by performing Principle Component Analysis before Cronbach's alpha estimation [19]. All the above studies argued that reliability tests could be done with smaller samples if the sample size is above 30 and the scientific rigor followed in the analysis. Thus, the pilot study achieved the minimum requirement of sample size to perform reliability tests.

The Principle Component Analysis showed high factor loadings except for one item in the clinical setting tool (Table 2). It was not necessary to remove the item at this stage as the same item had a good factor loading in the office setting tool. Previous research recommendations for studies with sample sizes between 30 and 50 said that Cronbach's alpha test could be done if only the first component Eigenvalue is above 6 and at least four items of the scale (tool) have factor loading above 0.8 during the Principal Component Analysis [19]. Here both tools performed well in principal component analysis with a higher margin. This result supported the move with further testing for internal consistency. Cronbach's alpha estimation was performed by the 'if items deleted' method by removing items one by one, in addition to the estimation of overall correlation. Testing Cronbach's alpha with the 'if items deleted' method is more reliable than the estimation of overall correlation alone.

The tools generated Cronbach's alpha values of 0.963 and 0.945 respectively for clinical and office settings, which means the tools have excellent internal consistency [17]. A study argued that Cronbach's alpha values presented without confidence intervals are usually misinterpreted by researchers as bigger confident intervals could undermine the reliability [17][18]. The intraclass correlation coefficient test manufactured the confidence intervals of 0.963 (0.945 - 0.976) and 0.945 (0.913 - 0.969) for Cronbach's alphas respectively in clinical and office setting tools. Even after considering the confidence intervals, the tools were found to establish excellent internal consistency [17].

All the alpha values produced by deleting items were lower than the overall alpha (Table 3), that in favour of the even contribution of items to the scale [20]. The changes observed in alpha values during items deleted testing were in the range of 0.054 and 0.073 for office and clinical setting tools respectively, which was minimal and acceptable [21]. All the above tests proved that none of the items had to be removed from the tools.

The split-half reliability test is another proven method for assessing the internal consistency of a tool [22]. The test was done on office and clinical setting tools and showed Spearman-Brown coefficients of 0.885 and 0.930 respectively. The estimated Spearman values confirm that tools have good internal consistency.

4.2. Limitations

The sample size for the piloting of both clinical and office setting tools was not ideal for reliability checking, that expected to affect the validity and strength of tests performed. However, the results were interpreted cautiously considering the weakness.

The length of the scales or the number of items in the scales was considerably high. Too many items in a scale are warned of redundancy effect that could overrate the alpha values higher than the reality [23]. Again, the findings were interpreted appropriately.

Though Cronbach's alpha and related tests were robust in assessing the internal consistency of the tools, they were not confirmatory in determining the appropriateness of factors included in the tools, like factor analysis. Therefore, the role of factor analysis cannot be replaced by Cronbach's alpha estimation, in the construction of research tools [24].

5. Conclusion

Two tailor-made tools were developed based on Hennessey-Hick's training needs assessment method to assess the training needs of HCAs working in clinical and office settings of state hospitals in Sri Lanka. The items of the tools were in interval scale and the training needs were estimated by providing equal weighting to items. The average mean scores of tools were computed and served as threshold values for prioritizing the training needs. Such an approach necessitates the assessment of the internal consistency of tools to assume the items are strongly correlated among them and with the latent factor measured. Tools were piloted among the middle-level managers at NHSL.

The Cronbach's alpha and other related statistical tests performed with collected data revealed that the internal consistency of tools was good in measuring the training needs of HCAs.

5.1. Recommendation

The training needs assessment tools were found reliable in identifying the training needs of HCAs working in state hospitals of Sri Lanka. It recommended applying the tool at the regional and national level to a larger

population (sample size of more than a hundred) to assess its reliability and validity further through more confirmatory statistical tests.

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