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Perceived Impact of Pre-Service Integrated Management of Childhood Illness (IMCI) on Case Assessment and Management Skills among Nursing Students

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Abstract

Objectives: This study aims to investigate likely impact of pre-service IMCI- training on nursing students' case assessment and management skills.

Methods: The study was carried out at Blinded Nursing Institute, Oman in May 2016. We developed a validated four constructs for developing a hypothetical model. The four constructs namely General Skills (GS), Knowledge, Attitudes and Skills (KAS), Confidence Level (CL) and Holistic Treatment Skills (HTS) that were used as latent variables to highlight their likely impact on the formative variable Assessment and Management Skills (AMS). Data were collected through qualitative structured questionnaires designed to measure participants' opinions about the studied constructs. For data collection purpose, we developed a qualitative questionnaire and invited nursing students to voluntarily take part in the study. The purpose of the study and research details was explained to the potential participants in written. Participants were invited through printed posters in the institute. In response, 114 participants completed the questionnaires. Four respondents did not complete the entire questionnaire consequently they were excluded from the sample. The final sample size of the completed responses was 110 (n=110).

Results: We first examined the factor loadings and calculated variances to ensure convergent validity. By exceeding 0.50, all the items in the model loaded well. We then measured the internal consistency reliability among the items through Cronbach's Alpha that was observed to be 0.694. For all the constructs, the values exceeded the desired value of 0.50. The composite reliability of all the constructs in the model evidently surpassed the recommended value of 0.700. In the cross-loadings, the value of R^2 was noted as 0.675 (R^2=67.5%).

Conclusion: The findings from the structural model support the hypothetical structural model. All the four studied constructs appear to significantly influence case assessment and management skills of pre-service IMCI-trained nursing students.

Keywords: Hypothetical research model; Childhood illness; Case assessment; Case management; Nursing; Child healthcare

Introduction

Childhood illnesses remain a challenge for healthcare professionals across low and middle-income countries. Common preventable childhood diseases continue contributing to global disease burden [1]. A majority of sick children are not properly assessed; and counseling for parents is rare [2,3]. While poor healthcare facilities and high treatment costs are among the major reasons for inferior child healthcare, however significance of clinical expertise cannot be overlooked [4]. Clinical expertise depend on the level of education and training [5]. One problem in primary healthcare (PHC) education is its reliance on subjective and indicative medical treatment approach [6]. With limited resources, care given in time could save innocent lives by preventing serious complications. Nevertheless, in serious conditions early detection of fundamental pathology might not be possible because of absence of either appropriate analytical approach or absence of sophisticated methods of investigations.

To overcome the continuing challenge of substandard child healthcare, the Integrated Management of Childhood Illness (IMCI) approach was developed by the World Health Organization (WHO) and the United Nations International Children's Fund (UNICEF) [7]. The strategy aims to reduce childhood mortality and morbidity rates through timely and appropriate case management of common childhood illnesses. It can be argued that IMCI advocates integrated pediatric education and training. Given its scope, IMCI aims to contribute to the growth, development and general well-being of the children under 5 years of age. IMCI- training is commonly delivered through a multidisciplinary group under the umbrella of PHC, such as nursing, immunization, pharmacy, quality control, dietitians, health educators, community support groups and doctors [8]. Several activities of the groups are combined and interrelated to the extent that it is virtually impossible to assign a separate role for each group. These groups support IMCI implementation. There has been significant work in this area, which has helped in bringing up the health standards.

IMCI has also played a fundamental role in achieving and sustaining the 4th millennium development goals for improving child healthcare [9], however, this achievement requires a synergy between health systems, families and communities. Therefore, investing in improving child healthcare and knowledge of families would allow them to play an active role in caring for sick children. For further improving child healthcare, WHO supports implementation of IMCI-training at both

medical and nursing schools. It is expected that such a policy would help set up learning priorities, and build up a holistic approach for assessing pediatric health problems. Based on the aforesaid, WHO recommends that all medical and nursing schools adopt the IMCI-strategy with an aim to improve pediatric teaching by gradually taking over the traditional training methodology? In a study by Abdel Rehman and Alfadil [10], it was observed that healthcare students who received IMCI-based education, made noticeable improvements in IMCI family practice. However, the study does not examine whether the healthcare students gained improved case assessment and management skills.

IMCI has been implemented and evaluated in a number of countries including Brazil, Peru, Bangladesh, Uganda and Tanzania under the assessment approach otherwise known as Multi-Country Evaluation (MCE). It has been observed that the strategy has helped reduce child mortality rates. In addition, it improved quality of healthcare in the mentioned countries. As a consequence, IMCI has been implemented in more than 100 countries [1]. In the year 2007, the implementation of IMCI reached 84% at PHC facilities [11]. Despite the wide adoption and implementation of IMCI strategy, it can be observed that childhood mortality and morbidity rates have not dropped as expected. While conducting literature review, we came across a high number of published articles that highlighted the persistent problem of childhood illness and high mortality rates [12]. Such findings highlight the pervasiveness of childhood illness in contemporary times. Several reasons could be associated with this situation, for example, lack of interest from policy makers, resistance from experienced medical professionals and even perhaps lower impact of IMCI-teaching approach on case assessment and management skills of healthcare professionals. While all the said assumptions could stand true, this study was performed to examine the likely impact of pre-service IMCI-training on general Assessment and Management skills of nursing students.

Previous Work

A comprehensive literature review was performed addressing global and regional perceptions about pre-service IMCI. Literature review was necessary to identify recent research and identify potential research gaps that could be further investigated. An interesting finding from a study performed by the WHO highlights that those children who receive healthcare from IMCI-trained healthcare professionals are more likely to be properly diagnosed and prescribed. This is an important finding as it supports the argument that IMCI-trained healthcare professionals have better knowledge in assessing, classifying and managing sick children. In a study, Pariyo et al. [13] investigated the effect of IMCI on the inequality of care provided to children under the age of 5 years in ten (10) districts of Uganda. The study revealed that IMCI-case management training lead to significant improvements in the quality of healthcare. These findings are consistent with similar evaluations that were made in countries including Tanzania, Uganda, Brazil, Peru and Bangladesh. Available not only highlights the significance of IMCI training but also call for a coordinated set of activities between teaching, training, healthcare systems, and government health policies.

Literature suggests that the community could gain benefits from the IMCI strategy. Ebuehi [14] investigated the effect of the IMCI Community Component on growth and development of children under the age of 5 years. He observed that there were evident benefits of IMCI for communities at large. This work exemplifies the potential role of communities in reducing child healthcare burden. And this target

can be achieved by adopting a community oriented IMCI approach [14]. It is stated that if IMCI approach were applied in an integrated manner, it could lead to cost effective healthcare systems for children under the age of 5 years.

Amaral et al. observed another example of the IMCI Multi-Country Evaluation (MCE) from the study that was performed [15]. Focus of the study was to evaluate the influence of IMCI on case management training on the quality of healthcare. In addition, it compared healthcare infrastructures with and without IMCI. In the study, the health workers' performance was assessed based on accurate classification of illnesses, case assessments, and communication skills. The results revealed that healthcare professionals who were trained with IMCI were better in assessing, classifying, counseling and treating sick children [15]. This supports the assumption that Integrated Community Management of Child Illnesses improves Knowledge, Attitudes and Practices (KAP) of families and communities towards better managing children's health.

Arifeen et al. [16] performed a study to evaluate health and economic effects of IMCI. The findings from the study confirmed that IMCI was positively correlated with significant improvements in the quality of health care for children in primary health units resulting in three-times better facilities. Based on the findings, they conclude that IMCI has the potential to improve healthcare professional's knowledge, attitudes and practices (KAP) [16]. Amin et al. performed a study to evaluate IMCI-trained doctor's Knowledge, Attitudes and Practices [17]. They evaluated whether IMCI training programs were useful in improving healthcare provision in a limited resource context. The results from the study indicated that there was no significant difference in knowledge of the studied groups [17]. These findings are rather unexpected because almost all the studies in available literature have shown positive outcomes of IMCI in one form or another. There could be several reasons for these findings, for example, lack of interest to learn something when one knows that it is just a part of a research study, lack of motivation to learn a new approach or relatively less period of time spent on the training.

Khan conducted a comparative analysis between IMCI-trained and non IMCI- trained healthcare professionals in Pakistan [18]. He noted poor knowledge of healthcare professionals regarding respiratory problems in both the groups. The knowledge about danger signs as well as management of diarrhea was also not found to be promising. The study reveals a gap in knowledge and practices of IMCI-trained healthcare professionals in managing common child illnesses according to the guidelines. Based on the findings, Khan proposes that there is a need for additional training workshops and seminars on a regular basis to update and strengthen existing knowledge of healthcare professionals [18]. While Khan argues for additional workshops and added training sessions, we emphasize on the significance a holistic teaching approach by introducing a curriculum that uses an Integrated Community Pediatric Teaching Approach (pre-service IMCI) [18].

Although there is rich evidence in available literature about the need as well as effectiveness of IMCI and its impact on improving child healthcare, however, we know of no study that has examined the impact of pre-service IMCI-training on improving case assessment and management skills of future healthcare workers. We found this as an area that needed further research, as it would help understand how healthcare students perceive IMCI-training and to what extent we can expect them to be better trained in assessing and managing child illness cases in clinical settings. Recognizing this gap, we conducted this

study to understand whether pre-service IMCI-training could lead to improved case assessment and management skills.

Methods

We developed and validated four constructs namely General Skills (GS), Knowledge, Attitudes and Skills (KAS), Confidence Level (CL) and Holistic Treatment Skills (HTS) that were used as latent variables to highlight their impact on the formative variable Assessment and Management Skills (AMS). All of the constructs, except CL, were based on expected impact of IMCI on child healthcare [19,20]. As a construct, CL was grounded on the theory of Self-efficacy [21], which posits that confidence has a strong impact on how people perform actions. In other words, confident and competent people are more likely to undertake an action when compared with those who are not. Consequently, the primary hypothesis of the study was that pre-service IMCI-training has a positive impact on nursing students' general skills, self-confidence, holistic treatment skills, and knowledge in such a way that it leads to an improvement in the general assessment and management skills.

This section presents recruitment and data collection, basic demographics of participants. Our target group was nursing students from Blinded Nursing Institute, Oman. For data collection purpose, we developed and distributed a qualitative questionnaire by inviting the students to voluntarily take part in the study. The purpose of the study and research details was explained to the potential participants in written. Participants were invited through printed posters in the Blinded Nursing Institute, Oman. In response, 114 participants completed the paper-based questionnaire. We observed that 4 respondents did not complete the entire questionnaire hence they were excluded from the study. The final sample size of the completed responses was 110 (n=110). We did not offer any financial rewards to the participants.

Results

The data were analyzed using Smart PLS (V 3.2.3). The minimum sample size for this type of analysis is calculated by using the heuristic ten times per the largest number of independent constructs influencing the dependent construct [22]. By doing so, the minimum sample size of presented study would be ten times 5 (i.e., 50). Basic demographics of the analyzed respondents are presented next. All of the participants were students at the Blinded Nursing Institute, Oman, and had received pre-service IMCI training through workshops, lectures, labs and field trips. Almost all of the participants had been in the nursing institute for more than 3 years (Mean=3.155; SD=0.361). A majority of the participants were females representing a total 70% of the sample size (Females=77; Males=33).

We used Smart Partial Least Squares (Smart PLS) software for data analysis. It is commonly used for predictive research [23,24]. It allows modeling of non-normal variables and small-to-medium sample sizes [25]. In the analysis, we applied a two-step approach that is recommended [26]. We examined the factor loadings and calculated variances to ensure convergent validity. By exceeding 0.50, all the items in the hypothetical model loaded well. We later calculated the internal consistency reliability among the items by using Cronbach's Alpha that was observed to be 0.694. As indicated in Table 1, values of 0.50 exceeded for all the studied constructs above the minimum level [26]. According to Nunnally, reliability ranges of 0.5 or 0.6 can be regarded as significant for such studies [27,28].

The composite reliability (CR) of all the constructs in the hypothetical model exceeded the satisfactory value of 0.7 [27]. Computing the correlations between all the pairs of the constructs

assessed the discriminant validity. All the correlations were noted to be below the threshold value of 0.900. Finally, the cross-loadings of the items on their assigned latent variables were larger than any other loading. Therefore, the reliability and validity of the constructs in the hypothetical model were satisfactory. Essentially, the hypothetical model (Figure 1) accounts for 67.5% (R²=0.675) of the variance in AMS with composite reliability of 0.826 and average variance extracted value of 0.614.

Further, we executed f-squared tests. The effect size of f-square tests for predictive analysis is small when the value is=0.02, medium when the value is= 0.15 and significantly large when the value=0.35. The effect size for all the four latent variables was significantly large except for CL. The effect size was observed to be 0.061 (CL), 0.105 (GS), 0.141 (HTA) and 0.596 (KAS). To observe the discriminant validity between the studied constructs, we first used the Fornell-Larcker Criterion [27]. (Hair et al.); However, it is argued that Fornell-Larcker Criterion does not detect discriminant validity reliably [23]. To ensure the reliability of discriminant validity, we later used the Heterotrait-Mono Trait Ratio (HTMT) [23]. The HTMT values between all the constructs were observed to be below the desired 0.90 that indicates that discriminant validity was established between the constructs (with an exception of AMS->KAS). Finally, when the path coefficients were analyzed, we found that CL (p<0.5), GS (p<0.5) and KAS (p<0.5) have a significant influence on AMS that supports the central hypothesis of this study.

Discussion

This study presents statistical findings using qualitative data. Data were gathered through a structured questionnaire. We drew a hypothetical structural model and used Smart PLS (V.3.2.3) to evaluate the strength and validity of the model. The primary hypothesis of the study was that pre-service IMCI-training has a positive impact on nursing students' General Skills (GS), Confidence Level (CL), Holistic Treatment Skills (HTS), and Knowledge, Assessment and Skills (KAS) in a way that it would lead to improved Assessment and Management Skills (AMS). The results indicate that the nursing students approved pre-service IMCI-training especially in terms of improving general skills, and confidence level to treat patients. Further, the hypothetical model indicates that there is a significantly positive influence of the studied constructs on general Assessment and Management Skills (AMS). Based on the statistical findings, we propose that pre-

Studied Constructs	Items	Factor Loading	AVE	CA	CR
GS	ImprovedSkills1 ImprovedSkills2 ImprovedSkills3	0.887 0.900 0.894	0.799	0.876	0.923
KAS	EnhancedKAS1 EnhancedKAS2 EnhancedKAS3	0.889 0.916 0.632	0.683	0.765	0.863
CL	ImprovedConf1 ImprovedConf2 ImprovedConf3	0.867 0.886 0.737	0.694	0.795	0.871
HTS	ImprovedHolAp1 ImprovedHolAp2 ImprovedHolAp3	0.841 0.783 0.905	0.713	0.861	0.881
AMS	AssessSkills1 AssessSkills2 AssessSkills3	0.764 0.747 0.837	0.614	0.694	0.826

GS: General Skills; KAS: Knowledge, Attitudes and Skills; CL: Confidence Level; HTS: Holistic Treatment Skills; AMS: Assessment and Management Skills; AVE: Average Variance Extracted; CR: Cronbach's Alpha; CR: Composite Reliability

Table 1: Factor loading, Average variance extracted, Internal consistency and Reliability of analyzed constructs.
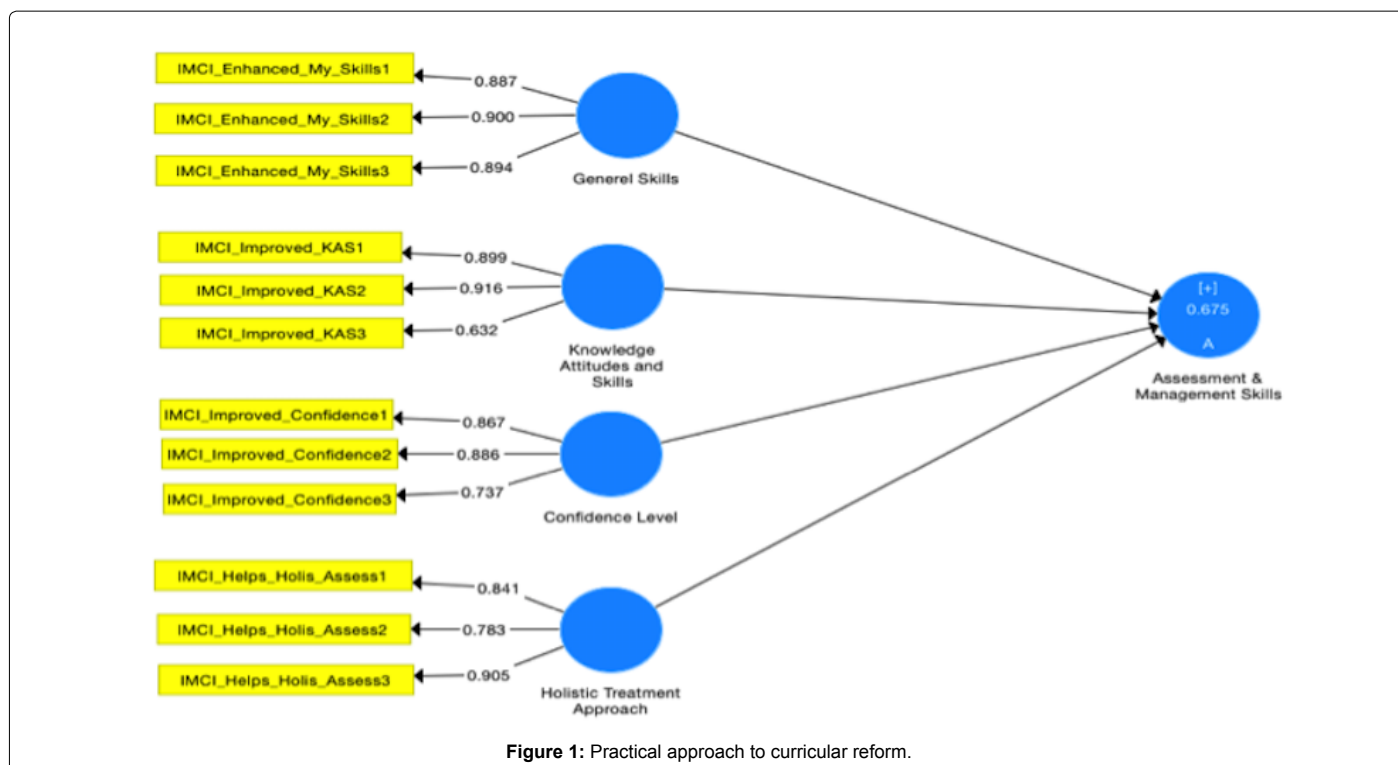
Figure 1: Practical approach to curricular reform.

service IMCI-training is essential for improved case assessment and management in the area of child healthcare. From the findings, we further assume that IMCI strategy can have a positive impact on childhood illness management leading to lower mortality rates. This would be consistent with the findings [11]. It is important to note that the IMCI strategy does not depend on the skills of healthcare professionals alone. As a matter of fact, there is a need for a joint effort by the healthcare policy makers, healthcare systems and the caregivers.

To the best of our knowledge, this is the first study of its kind that uses a structured hypothetical model to examine the influence of pre-service IMCI-training on case assessment and management skills of nursing students. The findings indicate a positive impact of pre-service IMCI-training in improving assessment and management skills of healthcare professionals in real life- and clinical setting. Like any other research, presented work has its limitations. First, the collected data comes from a single institution therefore a potential for biased opinions cannot be overlooked. However, potential bias remains a challenge for majority of research work. Second, because the study sample were all students at a nursing institute, it is hard to generalize the results.

Conclusion

A hypothetical structural model was developed and used to examine probable impact of pre-service IMCI-training on the case and management skills of nursing students. The findings indicate that pre-service IMCI- training can have a significant influence on the assessment and management skills of healthcare workers, which makes a strong case for introducing pre-service IMCI-training in medical and paramedical curriculum.

Acknowledgements

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