



Review

Objectively measured interprofessional education outcome and factors that enhance program effectiveness: A systematic review

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ARTICLE INFO

Keywords:

Interprofessional education
Teamwork
Interprofessional practice
Collaborative competences
Systematic review

ABSTRACT

Several studies have been conducted to evaluate the implementation of interprofessional education (IPE) across the globe. By looking at the timeline of each previous study, it can be inferred that the implementation of IPE has been improving continuously. However, the effectiveness of IPE still cannot be easily generalized due to misconceptions regarding how interprofessional collaboration capabilities should be evaluated. This study aims to generalize the learning outcomes that were produced by IPE in a global context and analyse the contributing factors. A systematic review was conducted within seven online databases as well as paperback periodical publications to search for the intended articles. A set of four criterions were assigned prior to the study using the standard Population-Intervention-Context-Outcome (PICO) model to ensure the included articles matched the study objectives. The quality of studies were appraised using the Medical Education Research Study Quality Improvement (MERSQI). Each included article was analysed using the narrative method to obtain the relevant information. Sixteen articles included in this study showed that IPE improved interprofessional collaborative knowledge, skills, and behaviour based on objective measurements. Complexity of the learning material, appropriateness of the program design, and referral to a specific standard of competence were assumed to play significant role towards the effectiveness of interprofessional education. This study results in several recommendation for future development of IPE, including a specific suggestion for its development in Asia region.

1. Background

Interprofessional education has been undergoing continuous improvement ever since the ideas of competency-based interprofessional education design were introduced (Barr, 1998; Barr et al., 2006). Previous reviews have recognized the importance of IPE in increasing knowledge, skill, and attitude towards interprofessional collaboration (Hammick et al., 2007; Reeves et al., 2008; Lapkin et al., 2011). However, those reviews included studies with self-report assessments. Those studies faced challenges in obtaining generalization of the effects because most IPE programs were evaluated using self-report assessment methods (Lapkin et al., 2013). Self-report assessment could not determine the actual learning outcomes unless it was conducted with objective measurement that was evidence-based (Shumway and Harden, 2003). There is an apparent need of revisiting the foundation of program evaluation to acknowledge the actual impact of interprofessional education (Thistlethwaite et al., 2015). Therefore, IPE programs should be evaluated using an objective measurement to provide reliable conclusions concerning the program success (Curran

et al., 2011).

Standards of competence for interprofessional collaborative practice have also been developed to provide guidance and direction in planning the core curriculum and courses, including the Core Competencies for Interprofessional Collaborative Practice (Interprofessional Education Expert Panel, 2011). The innovation has endorsed refinement in the implementation of IPE programs across the globe especially in medical institutions where negative outcomes are linked to miscommunication in health care service professions (Claramita et al., 2016). Major refinements are manifested in the development of course design (e.g. TEAMSTEPPS approach (King et al., 2008)) as well as observation-based measurement methods in assessing interprofessional collaboration skills (e.g. Interprofessional Collaboration Assessment Rubric (Curran et al., 2011) & Team-based Objective Structured Clinical Examination (Solomon et al., 2011)). Further studies are needed to evaluate the outcomes that resulted from the improvement in interprofessional education implementation (Kahaleh et al., 2015).

Based on the arguments above, this study was aimed to perform a systematic review to evaluate the outcomes of IPE in regards to the

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<https://doi.org/10.1016/j.nedt.2018.04.014>

Received 5 December 2017; Received in revised form 14 March 2018; Accepted 12 April 2018

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interprofessional collaborative competences. We also aimed to investigate factors that might contribute to the effectiveness of IPE. This study is expected to upgrade the insight of what has been accomplished so far by IPE regarding the innovations which have been developed and established in the global context. This study focuses solely on the objectively measured change in interprofessional collaborative abilities and their assessment according to the learning assessment pyramid (Shumway and Harden, 2003). Thus, we excluded studies with self-report assessment methods.

2. Methods

A systematic literature searching was employed within seven online databases and grey literature sources to search for articles which were relevant with the study objectives. Those seven online databases were EBSCOHost, CENGAGE Learning, Cochrane Library, ClinicalKey, ProQuest, Sciencedirect, and Scopus. We also hand-searched targeted paperback journals as well as dissertation reports since some periodicals and publications are not available online. The intended inclusion criteria were limited to the following characteristics:

Population	Health professional students or practitioners who experienced interprofessional education or training.
Intervention	Interprofessional education.
Context	Interprofessional education in health professional context. Articles with interprofessional collaboration practice theme were excluded from the study.
Outcome	Knowledge, attitude, skills, or behaviour change that were assessed with objective measurements.

Literature searching process was conducted using the Boolean combination of phrases as follows:

1. interprofessional educ*. ti,ab;
2. health profession\$. ti, ab;
3. medical. ti, ab;
4. nursing. ti, ab;
5. pharmaci\$. ti, ab;
6. competence\$. ti, ab;
7. 1 AND (2 OR 3 OR 4 OR 5) AND 6
8. knowledge\$. ti, ab;
9. skill\$. ti, ab;
10. attitude\$. ti, ab;
11. behaviour\$. ti, ab;
12. 9 OR 10 OR 11 OR 12
13. “interprofessional teamwork\$”. ti, ab;
14. “interprofessional role responsibility\$”. ti, ab;
15. “interprofessional communication\$”. ti, ab;
16. “interprofessional value\$”. ti, ab;
17. “interprofessional ethics”. ti, ab;
18. 13 OR 14 OR 15 OR 16 OR 17
19. (7) AND (12) AND (18)

The study had been registered for Ethical Approval from Ethical Review Board at Faculty of Medicine Universitas Gadjah Mada and ruled as exempted. The study was initiated by conducting filtering process. Through the filtering process [Fig. 1; page 6], sixteen articles were noted to match the study criteria and possessed good quality in research methodology. The second step of literature searching, i.e. full text scanning, was conducted by reviewer (RR) using a web-based application <http://www.rayyan.qcri.org> (Ouzani et al., 2016). The process included discussion and direct consultation with two other reviewers (MC and GRR) to validate the results. The quality of each research article was assessed by RR using the Medical Education Research Study Quality Instrument (MERSQI). The MERSQI is a validated

appraisal instrument to assess quality of a paper (Reed et al., 2008). Initial review was also conducted alongside the MERSQI appraisal to determine the appropriateness of assessment methods in concordance with the competences that are being assessed as well who assessed them. The appraisal of the studies was carried out by scoring each appraisal section based on explicit information contained in the full text. Sixteen articles were narrowed down by the process. Those sixteen articles were finally included in this study and then extracted using an abstraction guideline that was developed prior to the study. We used the narrative analysis method to retrieve relevant information from each article to meet the research purpose.

3. Results

The impact of IPE on the improvement of interprofessional collaborative competences and quality of care.

Through objective measurements, sixteen studies showed that IPE led to improvement in all domains of interprofessional collaborative competences [Table 1; page 9]. The descriptions of what competences were successfully achieved from IPE implementation can be seen in Table 2 (page 11). This finding suggested that IPE increases student understanding and performance on interprofessional collaboration. Two implementations of IPE involving clinical or community practice were also found to increase patient satisfaction towards care (Hallin et al., 2011) and health care outcome (Shiyanbola et al., 2014). It was hypothesized that IPE improves the behaviour of health care teams in providing care and health information, thus increasing patient perception in receiving care. Although the hypothesis still needs to be studied further, it reflected the conclusion that IPE increased the quality of care by improving the behaviour of health care teams in conducting interprofessional collaboration.

By looking at Table 2, it can be seen that several studies used quite similar indicators to measure how students perform particular competences from different domains e.g. “ability to delegate task” to indicate Roles and Responsibilities competence domain as well as Teamwork competence domain (Sigalet et al., 2015), and “role clarity” to indicate Roles and Responsibilities (Ralyea, 2013) while “ability to describe one’s own role and responsibilities and collaborate...” to indicate Teamwork (Packard et al., 2012). These findings are in line with the description in the Core Competencies for Interprofessional Collaborative Practice which describe particular indicators, such as recognizing roles and responsibilities, under the competence domain of Roles and Responsibilities as well as Teamwork. The intertwined indicators reflected that the nature of interprofessional collaborative competences are complementary to one another. They could not stand on their own. Therefore, designing IPE should be able to address the overall interprofessional collaborative competences.

The study found that only several indicators of competence were used to describe the ability of students in performing the interprofessional collaboration. The number was far less than the number of indicators mentioned in the Core Competencies for Interprofessional Collaborative Practice for each of the competence domain. It is fairly understandable though, considering that the overall indicators of competence is projected towards the interprofessional collaborative practice. By looking at the design and time frame of the studies, achieving all indicators would be very unlikely to happen immediately after the intervention of interprofessional education. Achieving all indicators would require continuous practice of interprofessional collaboration.

Factors that contribute to the effectiveness of IPE

1. The complexity of the learning topics

According to Tables 1 and 2, it can be noted that values and ethics as well as roles and responsibilities were less frequent to be highlighted as the focus of intervention compared to interprofessional

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