

*Full Length Research Paper*

# **The impact of inter-professional education for HIV course in the preservice health care professionals using the jigsaw technique**

**Catherine M. Ngoma<sup>1\*</sup>, Ruth Wahila<sup>2</sup>, Maureen M. Makoleka<sup>3</sup>, Namayipo W. S. Nankamba<sup>4</sup> and Michael M. Kanyanta<sup>5</sup>**

<sup>1</sup>Department of Midwifery, Women and Child Health, School of Nursing Sciences, University of Zambia.

<sup>2</sup>Department of Basic and Clinical Nursing, School of Nursing Sciences, University of Zambia.

<sup>3</sup>Department of Midwifery, Women and Child Health, School of Nursing Sciences, University of Zambia.

<sup>4</sup>Department of Midwifery, Women and Child Health, School of Nursing Sciences, University of Zambia.

<sup>5</sup>Department of Basic and Clinical Nursing, School of Nursing Sciences, University of Zambia.

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**Lack of inter-professional collaboration and practice among Health care professionals could impede effective HIV health services delivery leading to poor health outcomes in people living with HIV. Adopting Inter-professional Education by using innovative teaching methods such as the jigsaw technique could foster collaboration among health care professional. The School of Nursing Sciences at the University of Zambia in Lusaka implemented the Strengthening Interprofessional Education for HIV project whose purpose was to integrate innovative approaches that will systematically leverage and strengthen HIV training and professional networks targeted at improving outcomes for people living with HIV. An interactive case based training workshop was conducted with 61 final year undergraduate students from different health professional disciplines at the University of Zambia and Lusaka Apex Medical University in accordance with the jigsaw technique based on cooperate learning. A pre and post-test were administered and data obtained were evaluated using descriptive statistics. From the first training, an improvement was recorded in knowledge scores from 60.5% on pretest to 81.3% on posttest, while an average of 31% improvement was recorded on clinical confidence and inter-professional education. The Jigsaw technique appears to improve knowledge and self-confidence among health care professionals in HIV care. Therefore, inter professional education using the Jigsaw technique could be promoted and in cooperated into the preservice curricular of health care professionals in order to have strong HIV management teams that could achieve better patient outcomes.**

**Key words:** Inter-professional Education, Impact, HIV course, Jigsaw technique.

## **INTRODUCTION**

The jigsaw technique is a cooperative leaning strategy that promotes students motivation in learning, positive attitude, development of interpersonal skills and enrich

students' achievement (Mahajan, 2022). Jones and Schwartz (2018) reported that the jigsaw technique is a promising educational technique and efficient method for

interprofessional education. According to Goolsarran et al. (2020) it utilizes peer teaching and promotes collaborative learning and only one facilitator is required. Furthermore, Phillips and Fusco (2022) states that the Jigsaw technique combines problem based learning and cooperative learning. Studies suggest that the jigsaw technique is effective in teaching a wide variety of topics (Buhr et al., 2014; Bagheri et al., 2018). During the cooperative learning, students work in small groups and become responsible both as individuals and team members for mastering subject area content and are dependent on each other's work to succeed. Literature has shown that regardless of the subject matter, students working in smaller groups tend to learn more of what is taught and retain it longer than when the same content is presented in other instructional formats (Finelli et al., 2005; Barr et al., 2005).

On the other hand, Inter-professional education is an innovative approach that promotes collaboration and teamwork among health care professionals and improves health outcomes (WHO, 2010; Cusack and Goldonoghue, 2012).

According to Zwarenstein et al. (1999) inter-professional education refers to occasions when students from two or more professionals in health and social Care learn together during all or part of their professional training with the objective of cultivating collaborative practice for providing client or patient centered health care. Previous studies have shown that students in Interprofessional Education approach have better Interprofessional Education collaborative practice competences compared to those without IPE training (Cusack et al., 2012; Buring et al., 2009; Reeves et al., 2010). To enhance quality of patient care and improved health outcome, Universities and international health dependent on each other's work to succeed. Literature has shown that regardless of the subject matter, students working in smaller groups tend to learn more of what is taught and retain it longer than when the same content is presented in other instructional formats (Finelli et al., 2005; Barr and Ross, 2005).

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Interprofessional Education collaborative practice competences compared to those without IPE training (Cusack et al., 2012; Buring et al., 2014; Hanada et al., 2020; Hormeyer et al., 2018; Reeves et al., 2010). To enhance quality of patient care and improved health outcome, Universities and international health organisations are beginning to promote interprofessional education.

The STRIPE HIV project is the brain child of African Forum for Research and Education in Health (AFREhealth) implemented in conjunction with the University of California, San Francisco USA. The School of Nursing Sciences at the University of Zambia was subcontracted by the UCF to implement the project in Zambia.

The Zambia STRIPE HIV interprofessional education partnership program was a collaboration between the Schools of Nursing Sciences, Medicine, Health sciences and public health at the University of Zambia and Apex Medical University.

The goal of the collaborative program was to develop a team of the next generation of health care professionals to deliver the highest quality of collaborative and evidence informed care.

The training was a two day case based workshop covering a diverse range of HIV topics comprising 17 modules on HIV reflecting core HIV-specific competences that are important to delivering high quality HIV care in high-burden countries in Africa namely; New HIV diagnosis and Anti-retroviral therapy (ART) initiation in a woman of child bearing age (Module 1), Co-Morbidities in a patient with well controlled HIV (Module 2), Management of HIV- Tuberculosis (TB) Co-infection (Module 3), Prevention of Mother to Child transmission of HIV (PMTCT) and Care of a pregnant woman with HIV (Module 4),

Care of the adolescent girl at risk of HIV (Module 5), Post-Exposure prophylaxis (Module 6), Care of the patient with HIV and Cryptococcal Meningitis (Module 7), Management of Sepsis in a person with HIV (Module 8), ART adherence and Evaluation of Virologic failure (Module 9), End of life care in a patient with HIV (Module 10), Pre-exposure prophylaxis and care of men who have sex with men (Module 11), Care of the Adolescent male with perinatally- acquired HIV (Module 12), Health systems building blocks: Delivering high quality care to patients with HIV (Module 13), Community based HIV service delivery (Module 14), Traditional and complementary medicine and pneumocystis pneumonia (Module 15), Health workforce challenges and HIV care delivery (Module 16) and Care of the paediatric patient with HIV (Module 17). However, authors of STRIPE HIV project identified four compulsory modules which cover

\*Corresponding author. E-mail: catherine.ngoma@unza.zm.

core HIV content and these are modules 1, 3, 4 and 17 in addition, participating schools selected any other 2 modules from the remaining 13 listed modules to ensure that trainees were exposed to a variety of knowledge domains and inter-professional practice strategies.

By the end of the two day workshop, the students were expected to demonstrate proficiency in the modules and recognize the importance of inter-professional care and a culture of quality improvement. During training, learners were encouraged to gain greater competency in the following domains; values and ethics, roles/responsibilities, inter-professional communication and teams and teamwork. However for the purpose of this study students were assess only in the four compulsory modules.

## MATERIAL AND METHODS

An interactive case based training workshop was conducted with 61 final year undergraduate students from different health professional disciplines at the University of Zambia and Lusaka Apex Medical University using the Jigsaw technique as a cooperative learning approach. The University of Zambia is one of the oldest public institutions in the country located in Lusaka and has 14 schools. The Schools that participated in the study included the School of Nursing sciences, Medicine, Health sciences and Public health. The School of Nursing sciences trains Nurses and Midwives at degree level, School of Medicine trains Doctors while School of Health sciences trains Biomedical, Pharmacists and Physiotherapist students. Lusaka Apex Medical School is a private University which also trains health care professionals at degree level.

Ethical approval was sought and obtained from the University of Zambia ethics committee and permission to conduct the study was obtained from the study sites. Also, informed consent was obtained from the respondents. To ensure confidentiality of research participants, identifiers such as names and other information that can reveal the identity of research participants was not included in the research instruments. The nature of the study, benefits and objectives were explained to the respondents and they were assured that the information given would be treated with utmost confidentiality. Respondents were also intimated about the opportunity to withdraw their consent freely at any point during the study. Confidentiality of each participant was maximally maintained during and after the collection of their information. Information gathered from the respondents was stored in the computer for analysis by the researcher while copies of the filled instruments were kept for maximum safety.

Participants were conveniently selected to participate in the study. The inclusion criteria was based on being inter-disciplinary and all the finalist health professional students engaged in interprofessional education who gave consent to participate in the study were considered.

Participants were divided into mixed cadre groups of 5 to 6 and each group had one student appointed as leader and another student appointed as a note taker. Within each group, individual students were assigned cases to solve and presented to their colleagues in a larger group. Within their small groups students discuss the cases, reconcile points of view and synthesize information. The presentations invoked discussions and sharing of information. Students worked on one module (same) at time of course with the help of a trained facilitator.

The study used a pre-post-test design. Before the commencement of the course, a pre-test was administered to students online and immediately after, a post-test was conducted.

The pre and post-tests measured aspects such as clinical and technical knowledge related to the learning objectives outlined in the program and self-reported confidence in skills and abilities covered in the program including confidence to participate in HIV service delivery specific to each cadre's scope of practice in the domains addressed in the course, confidence to employ quality improvement and confidence to practice as an inter-professional team. Knowledge was assessed using a series of domain specific multiple choice questions, all questions were the same for all participants.

Confidence was assessed using a 4 point Likert type scale ranging from 1=(I feel uncomfortable with this topic/ need supervision from my supervisors to 4=(I feel very comfortable with this topic/without supervision as though in independent practice.

The pretest was administered to the Participants online prior to the commencement of the training and a post test were administered online immediately at the end of training. The online assessment used a standardised assessment tool developed by STRIPE HIV team.

Descriptive statistics were used to summarize socio-demographic characteristics of the participants. The sociodemographic characteristics included age, gender and category of the health professional. Differences in the pre and post-test knowledge and self-reported confidence were analysed using Wilcoxon sign and ranked test. The Wilcoxon sign ranked test was applied because distributions on assessments response variables were not normally distributed. All reported p values were two sided.

## RESULTS

Results from the analysis of the four mandatory Strengthening of Interprofessional Education for HIV (STRIPE HIV) modules were focused on. Only participants who had participated in both pre and post-tests were examined.

Table 1 shows socio-demographic characteristics of the respondents, 54% were aged between 26 and 30 years, 67% were females and 30% were nursing students.

Results in Table 2 shows a mean improvement in students' knowledge scores from 60.5% on pre-test to 81.3% on post-test. Table 3 shows an average improvement of about 31% in clinical confidence and Interprofessional education from the pre-test score to the post- test score.

## DISCUSSION

This discussion is based upon the research findings on the assessment of interprofessional education for quality improvement in HIV care conducted at the University Of Zambia School Of Nursing Sciences. In this study, most of the respondents were within the age group 25-30, were females and nursing students (Table 1). There were more nursing students who participated in the study because Nurses are the frontline workers providing

**Table 1.** Socio-demographic characteristics of the respondents.

|                               | Frequency | %    |
|-------------------------------|-----------|------|
| <b>Age</b>                    |           |      |
| 20-25                         | 10        | 16   |
| 26-30                         | 33        | 54   |
| 31- 35                        | 15        | 26   |
| 36 and Above                  | 3         | 4    |
| Total                         | 61        | 100% |
| <b>Gender</b>                 |           |      |
| Female                        | 41        | 67   |
| Male                          | 20        | 33   |
| Total                         | 61        | 100% |
| <b>Category</b>               |           |      |
| Medical students (MBCHB)      | 12        | 20   |
| Pharmacy Students             | 12        | 20   |
| Biomedical Science Students   | 12        | 20   |
| Environmental Health Students | 3         | 4    |
| Physiotherapy Students        | 4         | 6    |
| Nursing Students              | 18        | 30   |
| Total                         | 61        | 100% |

Source: Field data, 2019

**Table 2.** Comparison between Pre-test and Post-test regarding Knowledge score before and immediately after learning.

| Module   | Pre-test (%) | Post-test (%) | Improvement (%) |
|----------|--------------|---------------|-----------------|
| 1        | 81.8         | 94.1          | 12.2            |
| 3        | 53.8         | 71.3          | 17.5            |
| 4        | 77.9         | 92.0          | 14.1            |
| 17       | 28.3         | 67.8          | 39.5            |
| Combined | 60.5         | 81.3          | 20.8            |

Source: Field data, 2019

services to patients in the health care system in the country.

The impact of the STRIPE HIV training on Knowledge, clinical confidence on HIV care and interprofessional education, module and facilitator evaluation were assessed. According to the findings from analysis, there was a difference in the students pre-test and post-test knowledge scores from 60.5% to 81.3% respectively (Table 2). This difference was statistically significant. These findings are in line with Abdel-Mordy et al. (2021)'s study that showed a significant differences between the jigsaw technique and the lecture method with regards to learning achievement. The students who were taught using the Jigsaw method exhibited a more positive

attitude regarding the strategy. This study concluded that the jigsaw learning strategy is effective in enhancing students' attitudes and achievement and recommended the use of the strategy as a teaching method in the nursing curricular.

The results are also supported by Medinanamani's study conducted in 2017 in India which assessed the impact of the Jigsaw learning technique the concept of normal labour among nursing students at St Luke's college of Nursing. The study revealed significant difference in the performance of students before and after intervention. Similarly, Lalit and Piplan (2021) found a difference in the performance of the first year medical students in pre and post Jigsaw technique anatomy

**Table 3.** Improvement in Clinical Confidence and Inter-professional Education across four (4) compulsory module.

| Module        | Category            | Pre-test (%) | Post-test (%) | Improvement (%) |
|---------------|---------------------|--------------|---------------|-----------------|
| 1             | Clinical confidence | 77.7         | 87.5          | 16.1            |
|               | IPE                 | 82.5         | 90            | 12.1            |
| 3             | Clinical confidence | 52           | 70            | 34.6            |
|               | IPE                 | 60           | 70            | 23.3            |
| 4             | Clinical confidence | 56           | 74            | 32.1            |
|               | IPE                 | 77           | 95            | 22.58           |
| 17            | Clinical confidence | 60           | 87.5          | 45.83           |
|               | IPE                 | 75           | 95            | 23.3            |
| Total Average |                     |              |               | 31              |

Source: Field data, 2019

assessment scores test. In the same study, all the faculty members readily accepted the suggestion of implementing the jigsaw technique. About 88% of the students showed enthusiasm and interest to take up the activity. In line with our study, Mahajan (2022) showed that cooperate learning especially the Jigsaw technique was more effective than the conventional methods in practical training. In addition, Goolsarran et al. (2020) demonstrated the Jigsaw technique effectiveness on the improvement of collaboration learning engagement in 96 residents at stony Brook University Hospital. Another study by Buhr et al. (2014) showed that the Jigsaw technique was more effective than other methods in teaching medical students about long term and post-acute care and increasing knowledge. The study also showed that teachers could improve their teaching quality using cooperate learning technique. Shakerian and Abadi (2020) conducted a study on effect of the Jigsaw technique as a cooperative learning approach on motivation and job performance of community health workers. The findings showed that the intervention significantly increased the mean scores in the intervention group compared with control group. Moreover, Dhull and Verma (2019) studied the jigsaw teaching technique for teaching science at the University of Rohtak and they found that the jigsaw technique was effective in teaching science students and they recommended that the science teachers can develop the cognitive skills of students by employing the Jigsaw technique and integrate it into laboratory practice. On the other hand, Corea and colleagues (2022) compared the use of different educational learning strategies for teaching interprofessional geriatric competences in health professionals from different health care courses. The study showed no significant performance difference between the lecture method and the Jigsaw technique.

However, students' satisfaction was very good.

The current study shows an average improvement in clinical confidence and Interprofessional education as reported by the learner, Table 3. These findings are supported by Dassa et al. (2022) in Ghana who reported similar findings are also in line with what other researchers have found (Ojeku and Ogunleye, 2020, Mohammadpour and Khalkhali, 2018).

## CONCLUSION AND RECOMMENDATION

Use of inter-professional education based on jigsaw technique showed an improvement in HIV knowledge and self-confidence in HIV care among the preservice health care professionals. This can therefore, result in strong HIV management teams that are likely to achieve better patient engagement with the health care system if adopted. This implies that Inter-professional education based on jigsaw technique can be incorporated into the health care professionals' curricular.

## LIMITATIONS OF THE STUDY

Our study is not without limitations. One limitation of this study is biasness of the information due to the use of self-reporting tools. The study was also limited by its small sample size, as it only targeted finalist preservice students. To enable generalizability of findings, future studies should include a larger sample of student population from across the country.

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## CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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