Journal of Taibah University Medical Sciences (2023) 18(6), 1662–1671

Taibah University

Journal of Taibah University Medical Sciences

www.sciencedirect.com

Original Article

Design and validation of an interprofessional education module to enhance interprofessional competencies among students from healthcare professions

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Received 26 October 2022; revised 26 July 2023; accepted 28 August 2023; Available online 7 September 2023

الملخص

أهداف البحث: توضح هذه المقالة عملية تطوير وحدة تعليمية بين المهنيين في اضطراب طيف التوحد والتي تدمج الكفاءات المهنية وتطبيقاتها بين طلاب مهن الرعاية الصحية المختارين.

طريقة البحث: اعتمدت الورقة "طريقة البحث والتطوير لبحوث التعليم" من قبل "بورغ وجال" كأساس للدراسة. كانت الأساليب المستخدمة هي المقابلات شبه المنظمة ومناقشة مجموعة التركيز واستبانة تقييم الاحتياجات.

النتائج: تم التحقق من صحة دليل المقابلة (0.92) ودليل مناقشة المجموعة (0.98) واستبيان تقييم الاحتياجات بمؤشرات الصلاحية (1.00). تم اختبار استبانة تقييم الاحتياجات من أجل الموثوقية. تم إعداد وحدة التعليم بين المهنيين وأدوات التقييم لتقييم فعاليتها على أساس النتائج. كانت مؤشرات الصلاحية للوحدة ومقاطع فيديو المحاكاة (0.98) وسيناريوهات الحالة (0.97) وأدوات التقييم (1.00) واختبار تقييم الكفاءة بين المهنيين (0.98) واختبار تقييم الكفاءة بين المهنيين - قائمة مراجعة المراقبة (1.00). كانت درجات الموثوقية في اختبار تقييم الكفاءة بين المهنيين (0.87) واختبار تقييم الكفاءة بين المهنيين - قائمة مراجعة الملاحظة (0.90).

الاستنتاجات: ستساعد هذه الوحدة في التعليمية توفير البيانات والمعلومات الضرورية لأولئك الباحثين الذين يقومون بتدخلات تعليمية مماثلة تركز على كفاءات التعليم بين المهنيين والممارسة التعاونية ، وتحديداً من هذه المنطقة.

الكلمات المفتاحية: إعداد الوحدة التعليمية؛ المهن الصحية؛ أسلوب البحث والتطوير؛ وحدة التعليم بين المحترفين؛ أدوات التقييم؛ التوحد

Abstract

Objective: This article describes the process of developing an interprofessional education (IPE) module in autism spectrum disorder, which incorporates the interprofessional competencies and their applications among selected healthcare professional students.

Method: The paper adapted the "Research and Development method for education research" by Borg and Gall as a basis for the study. The methods used were semi-structured interviews, focus group discussion, and a needs assessment questionnaire.

Results: An interview guide, group discussion guide, and needs assessment questionnaire were validated with validity indices of 0.92, 0.98, and 1.00, respectively. A needs assessment questionnaire was tested for reliability (r = 0.96). The IPE module and evaluation tools to evaluate its effectiveness were prepared on the basis of the findings. Validity indices for module, simulation videos, case scenarios and the evaluation tools, Interprofessional Competency Assessment Test (IPCAT) and IPCAT-Observation Checklist (IPCAT-OC), were 0.98, 0.97, 1.00, 0.98, and 1.00, respectively. Reliability scores for IPCAT and IPCAT-OC were 0.87 and 0.90, respectively.

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Peer review under responsibility of Taibah University.

ELSEVIER Production and hosting by Elsevier

 https://doi.org/10.1016/j.jtumed.2023.08.007

Conclusion: This module will assist in providing data and necessary information for those researchers who undertake similar educational interventions that focus on the competencies of IPE and collaborative practice, specifically from this region.

Keywords: Assessment tools; Autism; Health professions; Interprofessional education module; Module preparation; Research and development method

Introduction

Interprofessional education (IPE) is learning that happens when two or more healthcare professionals (HCPs) learn "from-with-about" each other in a setting to collaborate and improve health outcomes of the populations.[1] The major challenge in preparing an IPE module is the need to incorporate content from all possible healthcare courses related to the theme or topic. Although the courses may have similar topics, the depth and extensiveness of content may vary, with specific requirements specific to each profession. Arriving at a common consensus regarding the content, taking into consideration the patient and family as well as other non-health courses, needs to be addressed and taken into account while preparing an IPE module.[2–4] IPE modules thus prepared in the past comprise experiential formats that involve simulation-based experiences, sessions with real or simulated and case-based discussions, along with team-building activities. Attempts have also been made to prepare modules rendered in an online or blended mode. Peer feedback and reflections have been embedded in IP learning activities to improve the learning outcomes.[5–8]

The preparation of a teaching methodology follows guidelines that enable the reflection of collaborative interaction. The measures taken, in order of their collaborative hierarchy as per the knowledge base, allow for sharing of information centred on the selected topic(s) from one or more courses, exploration of the presence of any dissonance, collaborative co-construction, testing and modification, and reaching an agreement for application.[9] The use of these actions are essential for inducing good levels of mental engagement, restructuring of knowledge, and having better quality of learning.[2,10]

The broad topics taken into consideration for this academic venture were "IP education and autism spectrum disorder (ASD)." The researcher proposed constructing an IPE module that would enable the learners from four selected HCP courses, namely Audiology and Speech Language Pathology (ASLP), Nursing, Occupational Therapy (OT), and Physiotherapy (PT), to improve their IP competencies of teamwork and communication to provide care for a child with ASD. This is considered a viable area of learning because children diagnosed with ASD often have complex needs that are quite different from a normal child. They also require assistance for various comorbidities that may be present along with the condition, thereby requiring a treatment plan that entails IP collaboration among several HCPs to obtain holistic and all-round care.[11,12]

This article is a methodology paper describing our journey through the knowledge portals of IPE and ASD, detailing the steps taken to prepare the module in a way to enrich the IP competencies of communication and teamwork among HCP students in caring for children with ASD. The objective of the study was to prepare an IPE module for students in healthcare professions on the application of IP competencies to the care of children with ASD.

Materials and Methods

The approach of this education-based research study is best described as a "research and development (R&D) design" developed by Borg and Gall (1983).[13] The design enables "the production of products and testing of their effectiveness," which in this instance, is the IPE module. The main object of the R&D method of research approach is to "develop a product that can fill the gap between educational research and practice."[13] This method provides a detailed description of the process followed by the researcher to obtain the said product.[14–17]

The current study was conducted in three major sections for preparation of the module and the evaluation tools, viz., semi-structured interviews (SSIs), focus group discussion (FGD), and needs assessment, after an extensive review of the literature related to methods used for module preparation and evaluation. The SSI and FGD were planned to gain an understanding of the topics to be included in the module and the possible methods to be employed during instruction. The design also considered aspects related to application and evaluation to achieve the predicted outcomes. Needs assessment was done after the synthesis and compilation of topics from SSI and FGD to rate the relevance of topics in the module and decide the order of placement of the content in the module. After the completion of SSI, FGD, and the needs assessment, preparation of the module and assessment tools including simulation videos, and case scenarios for discussion during the assessment for practical experience were undertaken.

Participants from educational and clinical fields were purposively recruited based on their expertise in teaching about the care of children with ASD as part of the educational curriculum and their clinical experience related to the care. They were recruited from nursing, PT, OT, ASLP, child psychiatry, clinical psychology, general paediatrics, and some specialists from IPE in the selected institution. The inclusion criteria included a minimum of 1 year of service in the institution, willingness to participate, and availability at the time of data collection. Parents and caregivers were selected from an education-based care setting and special school caring for children with various neurodevelopmental concerns as primary representatives that would be involved in the care of the child with ASD and had some training either from experience from caring for the child or by professional exposure. Preference was given to participants who were conversant in English. Interviews and discussion were to be conducted face-to-face; however, due to the COVID-19 pandemic, permission was obtained from the Independent

Ethics Committee (IEC) to conduct the same either by telephone or using an approved virtual platform.

The participants included for SSI were seven faculty/practitioners specialised in Nursing, PT, OT, ASLP, Child Psychiatry, Paediatric Medicine, and Clinical Psychology; a special educator; and a parent. The participants for FGD were seven faculty/practitioners specialised in Child Health Nursing, PT, OT, ASLP, Paediatric Medicine, Child Psychiatry, and Clinical Psychology; a sensory enrichment therapist for autism; and a special educator. The participants included for the needs assessment were seven faculty/practitioners specialised in Nursing, OT, PT, ASLP, Psychiatry, Paediatric Medicine, and Clinical Psychology. Among the participants recruited, three were also fellows from the Foundation for Advancement of International Medical Education and Research (FAIMER), specialised in IPE and IPP.

All required permissions for the study and ethical clearance were obtained from the IEC (746/2019) as per the prerequisites. All participants were provided with a complete participant information sheet with details regarding the study. Both oral and written consent were obtained from the participants with a note on audio/video recording of the proceeding for transcription and verification.

SSIs

The SSI guide was a set of questions prepared as a base for conducting the SSI to guide in the exploration of opinions for information to be included in the module. The SSI guide was prepared based on the available review of literature and had 17 items, introductory questions, key questions, and probing questions regarding the topic of interest (i.e., IPE and ASD). The SSI guide was validated by nine experts who had experience with topics related to IPE and/or ASD (item-wise content validity index [I-CVI] = 0.92 and scale-wise content validity index [S-CVI] = 0.92).

Nine participants were interviewed individually with each session spanning about 30–45 min per participant based on their availability. Interviews were conducted by telephone for the parent and special educator, while the faculty and practitioners were interviewed virtually using the Microsoft (MS) Teams platform. Each participant was provided a recap of the Participant Information Sheet (PIS) with an opportunity to clarify any doubts before and during the interviews, and verbal consent was taken with a reminder regarding the recording. Questions were asked based on the flow of the conversation and concentrated on acquiring the information as required for the module preparation. At the end of the interview, the discussion was summarised, and additional comments were welcomed. Interviews were recorded for transcription and verification as informed.

FGD

The FGD was conducted based on the FGD guide prepared, to guide the discussion so that the participants would be able to provide the information required to prepare the IPE module. The guide was prepared based on review of the literature and previous examples and included a detailed plan for the discussion such as ground rules and general icebreakers. It consisted of 25 questions: opening question, introductory questions, transition questions, key questions, and ending questions, with an opportunity to provide any other relevant information that would be useful in the preparation of module and evaluation tools. The guide was validated by nine experts (I-CVI = 0.98 and S-CVI 0.98).

Nine participants were consulted, and a virtual MS Teams meeting was scheduled based on their availability for conducting the FGD. The group was provided a recap of the PIS with ground rules for participation to allow for equal and unbiased contribution from the members. They were also reminded about the recording of the session, and verbal consent was retaken. Participants were also presented with the findings from the SSI for further discussion. The questions allowed for comments on the synthesis of the SSI and a progressive discussion towards identifying methods of implementing and evaluating the module. The session lasted for 1 h and 40 min, concluding with a brief summarisation of the discussion and prospect for adding comments or observations. The session was recorded for transcription and verification.

Needs assessment

Needs assessment was based on a rating scale containing 20 items in two sections, IPE, and ASD, listing the broad topics synthesised from the SSI and FGD. A 5-point scale represented the relevance of the topics with the values denoted as: 1, irrelevant; 2, less important; 3, somewhat important; 4, important; 5, very important. It provided an opportunity for additional remarks on the module plan. The tool was validated by seven experts (I-CVI = 1.00 and S-CVI = 1.00), and reliability testing was done by the "split half method" using "Spearman's correlation coefficient" formula among 20 faculty/practitioners who either taught or worked with children with ASD and/or had experience with IP education and practice (r = 0.96).

Needs assessment was sent to seven participants as an online questionnaire. The form had the PIS and requested consent before enabling the participants to proceed. All forms were filled over a period of 3 weeks, and the data were obtained as an excel sheet for analysis.

Results

Demographic characteristics (SSI and FGD)

Participants were recruited separately for each step of the module preparation process with no overlap. Table 1 shows the frequency distribution of selected characteristics of the participants in the SSI and FGD.

During the SSI, in response to the enquiry regarding experience (in years) caring for a child with ASD, the parent responded that his experience was personal and comprised trial-and-error methods employed while tending for the child. The special educator's experience with caring was through her education; she had a diploma in childcare along with her master's degree and had been working in a special school catering to children with a wide variety of neurological and developmental disorders. All faculty/practitioners (100%) selected for SSI and FGD worked in both

Table 1: Demographic characteristics of the participants (SSI and FGD).

N = 9			
Demographic Characteristics		Semi-Structured Interview	Focus Group Discussion
Age (years)	31–40	2	6
	41–50	5	3
	51–60	2	0
Sex	Male	3	4
	Female	6	5
Residence	Urban	7	8
	Rural	2	1
Education	UG	1	0
	PG	4	7
	Doctoral	4	2

clinical and educational settings. The participants in SSI largely had experience between 16 and 20 years (43%), whereas most of the participants in FGD had 1–5 years of experience (57%).

Synthesis of SSIs

SSIs were conducted with faculty/practitioners from Nursing, PT, OT and ASLP, parents/caregiver of children with ASD, child psychologist, child psychiatrist, and paediatrician. The interviews were scheduled and conducted depending on the convenience of the participants. Each interview spanned over an average of 30–45 min. The synthesis of the interviews was done broadly on the basis of the items in the SSI guide and categorised to fulfil the objective of the interview to identify topics for preparing the IPE module. Based on the data obtained from the interviews, the content areas were derived and compiled (Figure 1).

In addition, based on the observations of the researcher during the interviews, the following concerns were identified.

- Participants do not have a clear-cut idea about the concept of IPE.
- Participants assume that IPE and IP Practice (IPP) are the same as referring patients among professionals.
- Professionals presume that the early assessment and diagnosis of ASD will create social stigma and lead to labelling of the child.
- Professionals feel that training of HCPs though IPE for IPP will be good for the child, but are uncertain about the feasibility of its implementation in Indian settings.

Therefore, the inclusion of the following topics in the module was necessitated:

- concept of IPE,
- differences between IPE and IPP,
- awareness regarding ASD as a condition and importance of early assessment incorporated into the developmental assessment, and
- methods of conducting IPE programs.

Synthesis of FGD

Synthesis of the FGD was done broadly on the basis of the guide prepared and categorised to fulfil the objectives to identify topics for preparing the IPE module and enumerate the methods of preparing and presenting the module to the HCP students. The total FGD lasted for about a 1 h and 40 min. The discussion areas focussed upon were grouped and compiled for further proceedings as content, methods of teaching, and methods of evaluation (Figure 2).

In addition, based on the observations during the FGD, the following recommendations were added.

- Participants have an idea about the concept of IPE.
- Participants think that introducing IPE among students will be beneficial for future practitioners, patients, and their families.
- Participants recommend introducing IPE to their curriculum.
- Participants emphasise the need for practical aspects of IPE in the module being prepared.

The synthesis elucidated and supported the findings from the SSI. The topics to be included in the IPE module and methods of presenting the module to students of HCP were listed for consideration. The FGD also resulted in the identification of evaluation methods that could be considered during preparation of the tool.

Demographic characteristics (needs assessment)

Participants for needs assessment were selected from the educational institutions, all of whom (100%) were placed in both college and hospital settings for teaching and clinical supervision of students as per their respective departments. Most of the participants had ≥21 years of experience (3 of 7) and had doctoral degrees (6 of 7) in their respective fields (Table 2).

During the SSI, in response to the enquiry regarding the experience (in years) in caring for a child with ASD, the parent responded that his experience was personal and comprised trial-and-error methods used while tending for the child. The special educator experience with caring was through her education; she had a diploma in childcare along with her master's degree and had been working in a special school catering to children with a wide variety of neurological and developmental disorders. All of the faculty/practitioners (100%) selected for SSI and FGD worked in both clinical and educational settings. The participants in SSI largely had experience between 16 and 20 years (43%) in teaching and clinical practice, whereas most of the participants in FGD had 1–5 years of experience (57%).

Findings of the needs assessment

The needs assessment for the IPE module was done among seven HCP faculty/practitioners involved in teaching about and caring for children with ASD. The participants rated the importance of the topics selected to be included in the module, IPE, and Care of Child with Autism. Ten main headings each were identified respectively. The headings under consideration

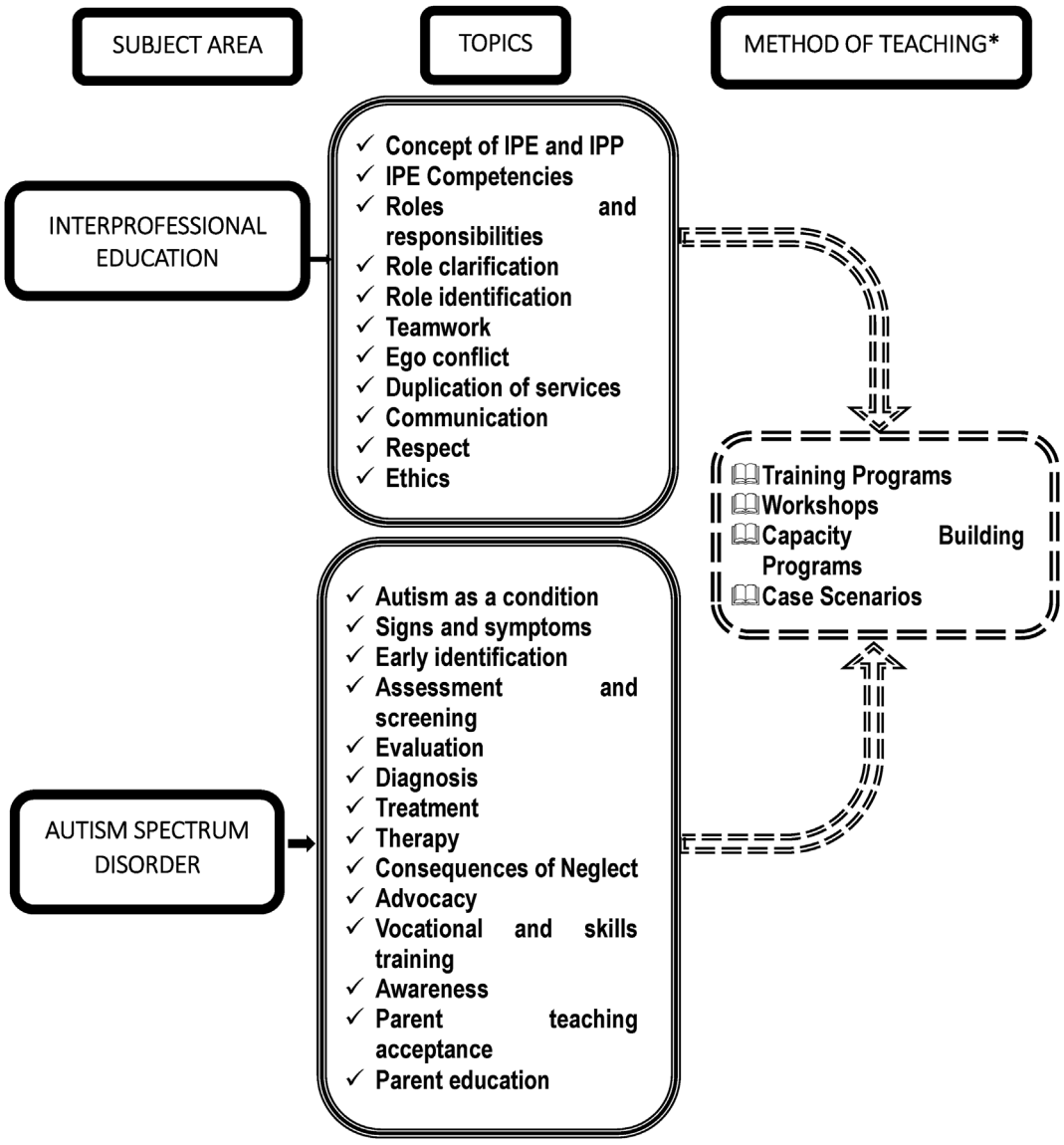

Figure 1: Synthesis of Semi-Structured Interviews. *Methods were selected from the lists formulated.

were the concepts of IPE and IPP, general overview of IPE competencies, communication, team and teamwork, ego conflict and respect, collaboration, ethics, duplication of services and record maintenance, facilitator role, and sensitisation. ASD as a condition, signs and symptoms, early identification, assessment and screening, diagnosis, treatment goals and treatment, collaborative treatment, IP rehabilitation, vocational and skills training, awareness and advocacy, education, and acceptance were the topics under consideration for ASD.

The participants were required to rate the headings as 'irrelevant' to 'very important' on a scale of 1–5. Acceptance was marked as "1" and non-acceptance as "0," and the frequency distribution was charted to find the percentage of acceptance per heading. Responses rating the heading as important and very important (4 & 5) by at least 50% of the raters (i.e., minimum four) were accepted and retained, while responses rated as somewhat important, less important, and irrelevant (1, 2 & 3) were rejected. In IPE, all of the participants (7 of 7) accepted 9 of 10 headings, while one was accepted by six of the seven participants. In ASD, five items were unanimously accepted, while three items were accepted by six of seven participants and two items were accepted by five of seven participants. The majority of participants scored each question above 80%, and each participant scored the tool with above 70% acceptance. Therefore, all headings were accepted for inclusion in the module without any revisions.

Module preparation

Based on the outcomes identified from the synthesis of the SSI and FGD, and confirmation through the needs assessment, the IPE module for HCP students on the application of IP competencies to the care of children with ASD was prepared as per the outline planned. The module had two sections: Section "A" discussed the basics of IPE, IPP, collaboration and teamwork, with an emphasis on IP

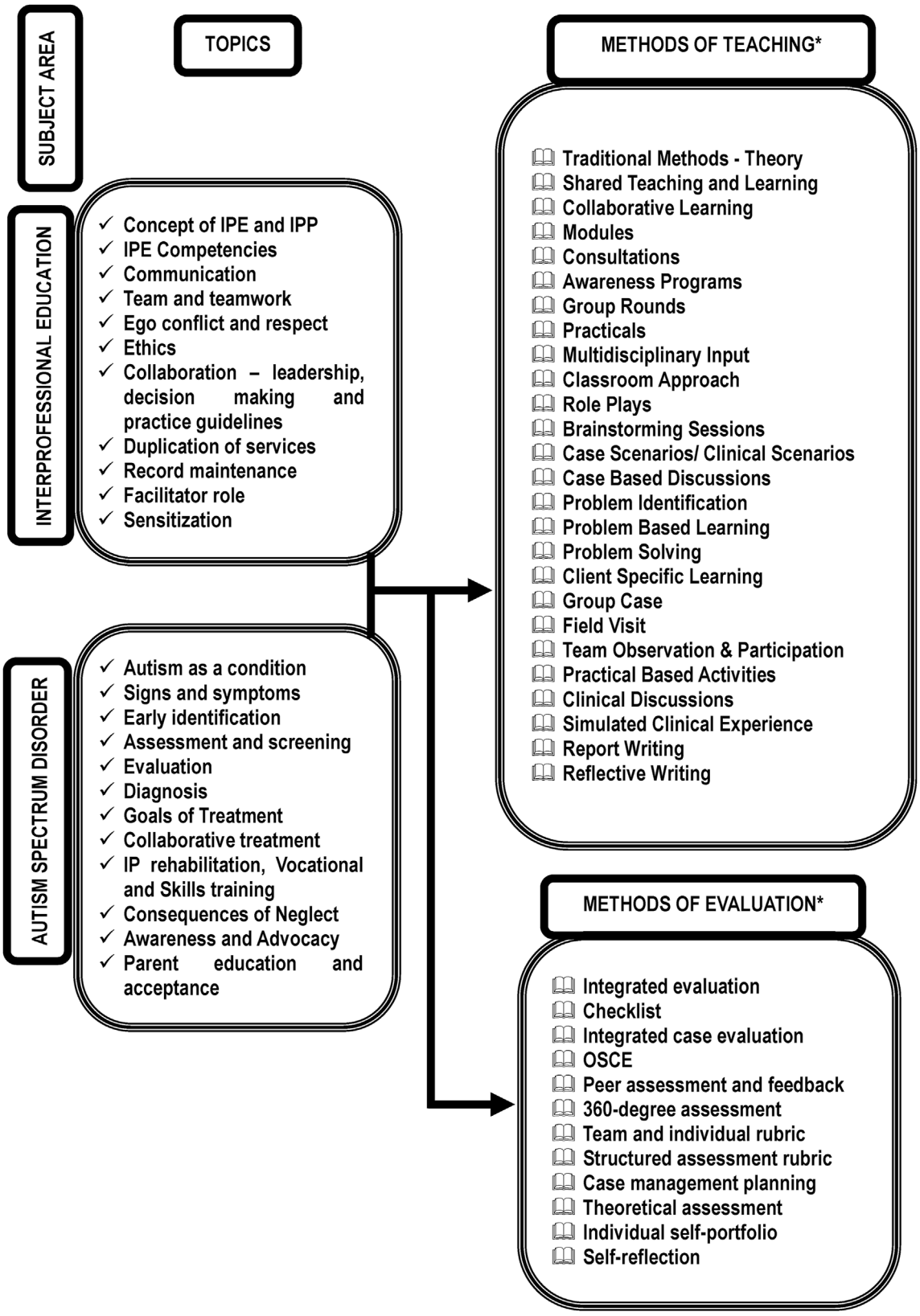

Figure 2: Synthesis of Focus Group Discussion. *Methods were selected from the lists formulated.

Table 2: Demographic Characteristics of Participants (Needs Assessment).

N = 7			
Demographic Characteristics		Frequency	Percentage
Age (in years)	31–40	5	71%
	41–50	0	0%
	51–60	2	29%
Sex	Male	1	14%
	Female	6	86%
Residence	Urban	7	100%
	Rural	0	0%
Education	PG	1	14%
	Doctoral	6	86%
Setting	College/Teaching	0	0%
	Hospital/Clinicals	0	0%
	Both	7	100%
Experience (in years)	1–5	0	0%
	6–10	1	14%
	11–15	2	29%
	16–20	1	14%
	≥21	3	43%

Communication and IP Teamwork; and Section "B" reviewed content on ASD, including all aspects of the condition with a distinct emphasis on incorporating IP communication and IP teamwork in care.

The module was validated by 10 experts from various HCPs related to ASD and those who had experience with IPE and IPP (I-CVI = 0.98 and S-CVI = 0.98). The suggestions were incorporated into the making of the final module. The methods planned for application of the module included short lectures, lecture cum discussion, simulation videos, team building activities, and case-based IP team management activities aimed at enhancing IP Competencies.

The simulation videos included for better understanding of the module were prepared to illustrate the experience of a parent with referral system for provision of care in comparison with the parent's experience of obtaining care through a system of IP collaborative practice (IPCP). The depiction of these situations was prepared as animated videos. The videos were validated by 10 experts from various HCPs and those who had experience with IPE and IPP (I-CVI = 0.87 and S-CVI = 0.97).

Assessment tools

"IP Competency Assessment Tool (IPCAT)" and "IPCAT-Observational Checklist (IPCAT-OC)" were prepared to assess the effectiveness of the module; both were validated and tested for reliability. Pretesting of tools was done among 10 HCP students to ascertain the need for any modifications. All of the selected participants responded to all of the given questions. There were no discrepancies identified in the tools; the participants were able to complete the tools without any difficulties and the time taken to complete the tools was adequate. A pilot study conducted to check the feasibility of the study confirmed that the study could be conducted according to the proposed implementation plan.

IPCAT

The IPCAT included three sections: viz., Self-Administered Questionnaire – Knowledge and Self-Administered Questionnaire – IPCs, in addition to the Demographic Proforma. The demographic proforma had 10 items; the Knowledge questionnaire had 20 multiple choice questions; and the IPC scale had 20 items, of which 4 were negatively marked.

The IPCAT was validated by 10 experts from HCPs relevant to the care of children with ASD and those who had experience with IPE and IPP. Suggestions were incorporated into the making of the final Tool (I-CVI = 0.98 and S-CVI = 0.96). Reliability testing was done by the split-half method among 20 students using Spearman's correlation coefficient formula (r = 0.87).

IPCAT-OC

The IPCAT-OC consists of a checklist of 20 items under two main sections eliciting responses regarding individual and group behaviour. The individual behaviour would be observed based on 10 and 7 items described related to the two selected IP competencies - communication and teamwork, respectively. The description for observation of group behaviour consisted of three items.

The IPCAT-OC for care of children with ASD was validated by six experts (I-CVI = 1.00 and S-CVI = 1.00) and accepted without any suggestions. Reliability testing was done by interrater reliability among two experts specialised in IPE and IPP. The raters were provided with the simulation videos, and one characteristic was identified for them to observe against the criteria developed in the tool. The rates of agreeability and disagreeability were analysed for the pair of reviewers. The Cohan's Kappa score for reliability was 0.90.

The observation would be done on the basis of group discussion of the case scenario of a child diagnosed with ASD. Six experts validated the case scenarios for IPCAT-OC. More than five suggestions in each scenario were considered as not accepted in each scenario (I-CVI = 1.00 and S-CVI = 1.00). The case scenarios were accepted by all experts without any major suggestions.

Discussion

Developing an IP education module warrants inclusion of curricular outcomes relevant to the profession as stipulated by accreditation councils and regulatory bodies. The researcher also has to keep in mind that the process should follow the principles of teaching-learning in general and acknowledge the considerations of IP context and learning environments. The practical context of logistics and time frames for implementation of the modules, whether it is instructor-based or self-learned, also need to be taken into consideration.[3,18]

To successfully achieve the objectives of the education module, the training of faculty and resource persons involved in the delivery of an IPE module is important. The need for proper facilitators that can help students integrate the principles of IPE into their practice make a great difference in

their learning process.[19,20] Although self-learning may be done, the actual practice and practical exposure of students to the activity planned will determine the acquiescence between theory and practice. Faculty members must be aware of IPE and how to interact and be part of the IP team in practice as facilitators and be able to observe and guide students of various HCPs as one single unit of learning. The identification of barriers that may hamper a smooth learning situation and a collaboration among students and faculty would be an effective step towards good IPE. A decent knowledge about IPCs, especially teamwork and communication, would be an added bonus.[21–23]

As per the pilot study conducted by Velladath and others in India (2022), an IPCP training module was designed for HCPs. The module discussed ASD among 42 HCPs from seven professions. Pre-post analysis was conducted and a thematic analysis was elicited that revealed differences in the IPCs of HCPs regarding IP care for children with ASD.[24]

Bhargava and others (2022), India, conducted a prospective before-and-after study to develop an IPCP module for conducting tracheotomy as a life-saving procedure. The training was conducted among participants from ENT department, nurses and allied health professionals. The findings showed that a motivated IPE team can use the module to effectively train and conduct the procedure using the module for tracheostomy care.[25]

A pre-operative counselling program was developed by Sheela et al (2019), India using an IP approach for patients scheduled to undergo total laryngectomy to reduce their anxiety related to the procedure. The counselling module was prepared and validated by a team of experts constituting HCPs from head-neck surgery, physiotherapy, speech language pathology and psychology. The module was accepted for use and is considered beneficial for counselling patients before the surgery with reported efficacy.[26]

The results from this paper showed that the methods used for module preparation were valid and reliable. The steps entailed in the preparation of SSIS, FGD guide, the needs assessment questionnaire and the module and its evaluation tools spanned a little more than a year including completion of validation and reliability before being used in Module preparation. The module preparation took into consideration activities that would be necessary to make it more interactive and IP, including its structure, simulation videos, questions for revision and reflection within the sections of the module; activities to be performed as a group; and discussions, all of which add to the substance of the module. It also includes the observation session along with discussion of case scenario, which though may not be real-time, will give students experiential learning formats that help them develop competencies of IPCP while helping them reflect on their professional identities.

The whole module also offers a comprehensive insight into IP education and practice. The course learning objectives of the module are developed to meet the objectives of the topic as an IPE learning method with ASD as an example for evaluation of outcomes. However, this module deals with only two IP competencies, teamwork and communication, giving a brief of regular teamwork and communication that is seen in education and practice settings. The section regarding ASD was mainly intended to be a revision of the course from the viewpoint of HCP students, considering that they would have completed the topic in their regular curriculum with a uniprofessional focus. The IPE module will help them focus on ASD using an IP lens and deal with the implementation of IP learning in collaborative practice.

The process of adapting the module as an educational material based on the suggestions of subject experts is a very crucial step in module preparation. The validation helped in making the module more scientifically precise and helped to attain the objectives that are positioned to obtain the expected outcomes. In addition, expert validations also ensured that the material to be developed was contextual and relevant to meet the health needs of the community that the students were likely to engage.

The field of IPE and IPCP is ever evolving. Hence the content for the module was obtained from the extensive review of literature of topics and based on relevant and updated reviews available in books and journals. The researcher made sure to include the relevant citations and references for the content that was current and free from errors. A reference list recommended for students' further learning and clarifications was also included.

The IPE module was prepared rooted in the needs of children with ASD and their parents and caregivers and took into consideration the principal concepts of IPCs and IPE. The module was prepared in English, the language commonly used across the majority of countries in the world. The main limitation of the study was related to the prevailing COVID-19 pandemic. SSI and FGD were conducted online, using MS Teams and the telephone as a deviation from face-to-face interaction, which would have been more beneficial in providing verbal as well as non-verbal cues helpful in providing additional inputs.

Future studies by researchers involving learners from various other health professions can provide more insights in refining this module. In addition to the two competencies included in this module, we plan to incorporate other competencies such as role clarification, patient-centred practice, and collaborative leadership in future modules. Plans to include simulations and grand rounds involving clinical experience may be considered to make the learning clinically relevant and more focused towards the targeted health outcomes beneficial to students. We believe this approach can be used for the preparation of IPE-based modules for various health conditions across the HCP courses as seen in the studies reviewed.[24,25] The implications of this study and paper are hence applicable to future education and research in IPE.

Conclusion

The current methodology paper explains the preparation of the IPE module for children with ASD to develop IPCs among HCP students. Although there are no predetermined rules for preparation of the module, the researcher has selected three steps, viz., SSI, FGD, and needs assessment, to enable the sharing of information, exploring the presence of dissonance, co-constructing, testing, and modification of the tools and module and reaching agreement for the application to help with construction of the module. SSI and FGD were used for identification of the content required for the module, while needs assessment was aimed at exploring dissonance and getting the content to a single

point of agreement. Discussion regarding construction and testing the module and tools were also included within the framework of SSI and FGD, with confirmation from the needs assessment to prepare the final module. The prepared module needs to be implemented and tested using the tools formulated for evaluation to confirm that the module prepared would be useful for IPE and further research in IPE.

Source of funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflict of interest

The authors have no conflict of interest to declare.

Ethical approval

KMC & KH IEC: IEC 746/2019 (October 09, 2019)

Authors' contributions

SSN, AG, and CAM conceived and designed the study. SSN conducted the study, collected, and organised data, analysed data, and wrote the initial and final draft of the article. CAM, AG, and BSN provided the logistic support and critically reviewed the document for appropriateness of content. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

Acknowledgements

The authors acknowledge the support of the Doctoral Advisory Committee in guiding and providing suggestions regarding the study.

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How to cite this article: Nagelli SS, Mohammed CA, Nayak BS, George A. Design and validation of an interprofessional education module to enhance interprofessional competencies among students from healthcare professions. J Taibah Univ Med Sc 2023;18(6):1662–1671.