



Short Report

A Literature Review on the Facilitators and Barriers to the Uptake of Interprofessional Collaboration in the Field of Assistive Technology within Rehabilitation Medicine

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Article Received: October 20, 2020

Article Accepted: December 12, 2020

Article Published: February 14, 2021 (online)

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Abstract

Assistive technology (AT) enables an optimized life for persons with disability through the scaffolding of functional capabilities. However, AT provision faces challenges such as long approval processes, funding inadequacies, and difficulties integrating evidence into practice. A means to address these issues is through interprofessional collaboration (IPC), the process by which health professionals efficiently coordinate and work with each other towards a common goal to maximize limited resources. To promote its effective implementation, there is a need to know the facilitators and barriers that affect its implementation. Thus, this paper aims to review the facilitators and barriers to the uptake of IPC in the field of AT within rehabilitation medicine identified by existing literature. This literature review followed the steps outlined by The Model Systems Knowledge Translation Center. Articles published between January 2000 until September 2019 were retrieved from four electronic databases (Cochrane Library, PubMed, Scopus, Science Direct). Three studies were included in the study. Facilitators identified were: (1) optimal work culture, (2) professional competence, and (3) associating with team members. Barriers to effective IPC in the field of AT were identified as: (1) presence of professional silos, (2) lack of unified language, and (3) gaps in bureaucratic support. The mechanisms and factors in implementing interprofessional collaboration identified by the World Health Organization are vital in the field of AT. However, the barriers identified above need to be addressed to promote the uptake of IPC within this specialized field.

Keywords: Collaborative practice; clinical setting; assistive product, service delivery

INTRODUCTION

Assistive technology (AT) is any product used to prevent, replace, or improve the functional capabilities of persons with disabilities (PWDs) to enable participation in daily life.¹ AT facilitates one's ability to achieve well-being and allows for an equitable life.^{2,3} The World Health Organization has supported the positive impact of AT on the health and well-being of a person and their family, as well as broader socioeconomic benefits.⁴ Despite these positive outcomes, AT provision is hindered by numerous factors. In Germany, AT providers and PWDs experienced difficulty due to bureaucratic burden and long AT approval processes.⁵

Additionally, there are instances where health professionals recommend numerous and conflicting types of AT to end-users. This greatly impacts AT users in developing countries, where AT acquisition is typically an out-of-pocket expense by the user and their family.⁶ Stakeholders need to decide and prioritize what they perceive to be the most necessary of AT, often with conflicting priorities or without the guidance of the health professionals, thereby limiting ideal performance.

A means to address these issues is through the practice of interprofessional collaboration (IPC). IPC occurs when health professions from various

backgrounds and specializations, together with stakeholders, work together as a team to deliver the highest level of quality care.⁷ A greater understanding of IPC will contribute towards developing “flexible health workforces that enable local health needs to be met while maximizing limited resources”.⁷

AT selection should be done with a team of professionals and consultants trained to match an AT to specific needs.⁸ Moreover, IPC has been found to optimize the AT prescription process.⁹ Thus, there is a need to know the facilitators and barriers that affect the implementation of IPC. Knowing these facilitators and barriers will guide clinicians and organizations towards the first step to effectively implement an IPC-ready program within an institution. This paper aims to review the facilitators and barriers to the uptake of IPC in the field of AT within rehabilitation medicine identified by existing literature.

METHODOLOGY

This literature review was conducted using the process outlined by The Model Systems Knowledge Translation Center.¹⁰ Steps include (a) selection criteria, (b) search strategy, (c) data collection, (d) displaying data, and (e) analysis and synthesis.

Selection Criteria. Inclusion criteria are as follows: (1) IPC done by a health professional with health or non-health professional/s or organization to create, select, acquire, train, or maintain an AT device used by a client, (2) all types of studies that discuss the actual process done in collaboration with other professionals, (3) published studies with electronic copy accessible from the internet, (4) studies published between January 2000 to September 2019, and (5) are published in the English Language. Exclusion criteria are as follows: (1) the use of rehabilitative devices which are used only as part of clinical treatment, (2) collaboration done in the process of formal education on a hypothetical client, and (3) editorials and commentaries.

Search Strategy. Articles were independently searched and retrieved from four electronic databases (Cochrane Library, PubMed, Scopus,

Science Direct). Search combinations were connected by Boolean operators and were formulated by using alternative terms and wildcards of the following key terms: *Assistive Technology, Collaboration, and Rehabilitation* (see Table 1).

Table 1. Alternate Terms

Assistive Technolog*	Collaborat*	Rehabili*
Assistive Product	Cooperat*	
Assistive Device	Partnership	
	Alliance	

Data Collection. The search yielded 270 articles for screening (see figure 1). When there were concerns about whether an article met the inclusion criteria, the team convened for deliberation. Data extracted from the articles that met the inclusion criteria were the *title, authors, year published, country, research design, team members, facilitators, and barriers.*

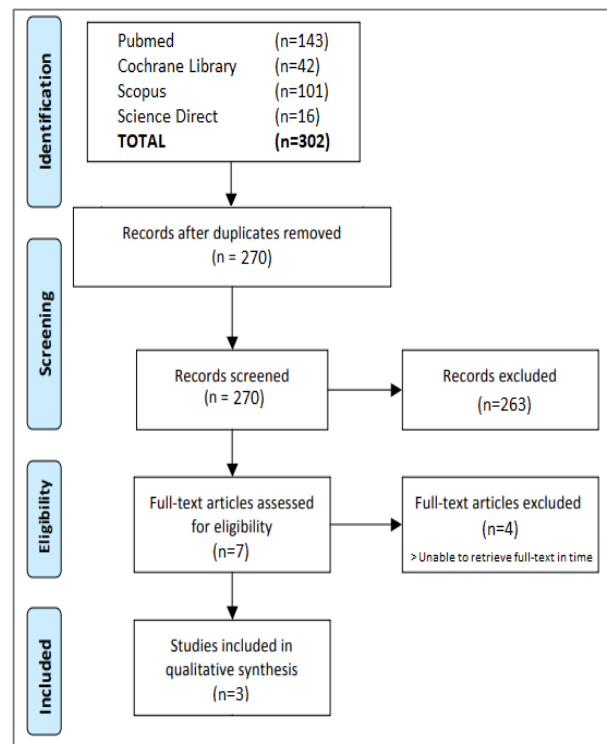


Figure 1. Search Process

Displaying Data. Three studies, which documented both facilitators and barriers to collaboration, were included in the study. Four studies were excluded due to the inability to obtain full-text articles. The data gathered are summarized in Table 2.

Analysis and Synthesis. Identified facilitators and barriers along with the features documented in Table 2 were clustered according to their common features via a free spreadsheet program. Themes were then formulated from the clustered codes.

RESULTS

Facilitators. Three clusters from six codes were identified as facilitators towards IPC in the field of AT within the rehabilitation medicine (see Table 3 for an overview). Notably, all facilitators identified were congruent to that of the mechanisms and competencies necessary in IPC.^{7,13} Findings are expounded in the subsequent sections.

Optimal Work Culture. Effective communication strategies and shared decision-making were identified as facilitators⁹, which are in line with the mechanisms identified by WHO to stimulate IPC.⁷ As many professionals are involved, conflicting goals and differing perspectives are often observed.¹⁴ To address this issue, there is a need to optimize the work culture through practicing effective, consistent, and clear communication strategies between professionals, to share each professional's perspective on the necessary characteristics needed from the AT by the user as determined by their specific needs, and to conglomerate to decide on a singular goal in relation to AT provision.⁹

Professional Competence. As AT is a specialized field with constant development, high expectations are embedded among professionals, necessitating the advancement of new knowledge geared towards both AT and IPC. This knowledge is vital if one is to share information and collaborate with other professionals.^{9,11-12} An understanding of the practical use and applicability of an AT, as well as the role of other stakeholders involved, may impact a health professional's inclination to

engage in IPC. In a study by Malinowsky and colleagues, the collaboration between occupational therapists and assistant nurses were influenced by their varying understanding of PWDs, which cascaded to their respective approach to supporting the use of ATs.¹¹ Additionally, possessing preliminary comprehension of ATs also assisted professionals in clarifying the use of ATs to PWDs and their significant others, as well as justifying the practical usability and necessity of ATs to other professionals¹¹. Awareness of one's role and other professions' role in assessing and addressing a patient's healthcare needs is a core competency for effective collaboration.¹³

The use of a model for knowledge translation can help professionals share a common understanding and language, not just among professionals but also with the end-users of AT devices¹¹. Providing practitioners with "a way of thinking" can help them deliberate about ways to translate their knowledge into practical use in terms of designing interventions that support the use of AT.¹¹

Sense of Team Membership. An opportunity for health workers to interact with other professions and capacitate each other in their respective professions lays the foundation for IPC.⁷ IPC entails incorporating multiple perspectives across different professions to yield novel and holistic solutions to address complex healthcare needs.¹¹⁻² Thus, recognizing the knowledge and experience of another health professional is beneficial in identifying and providing the ideal AT device and to the end-users.^{9,11}

Barriers. Three clusters from five codes were identified as barriers towards IPC in the field of AT within rehabilitation medicine. The barriers identified below possess a compounding effect wherein issues affecting AT service delivery, and challenges on the application of IPC in general may influence one another; leading to complex problems.¹⁵⁻¹⁸ Findings are expounded in the subsequent sections.

Silo mentality. The study by Malinowsky and colleagues captured the compartmentalization and the lack of shared accountability among professionals, as exemplified by one participant pointing out that AT prescription and follow-up

Table 2. Summary of Included Studies

Title	Advantages and disadvantages of interdisciplinary consultation in the prescription of assistive technologies for mobility limitations ⁹	An approach to facilitate healthcare professionals readiness to support technology use in everyday life for persons with dementia ¹¹	Interdisciplinary development of manual and automated product usability assessments for older adults with dementia: lessons learned ¹²
Authors	de Laat FA, van Heerebeek B, van Netten JJ.	Malinowsky C, Rosenberg L, Nygård L.	Boger J, Taati B, Mihailidis A.
Year Published	2018	2013	2015
Country	Netherlands	Sweden	Canada
Research Design	Cross-sectional study	Grounded Theory with Constant Comparative Analysis	Reflection
Team composition	Technician: prosthetist, orthotist, pedorthist or orthopedic (shoe) technician Prescriber: Rehabilitation specialists, orthopedic surgeons, vascular surgeons, others.	Occupational Therapists Assistant Nurses Nurse Assistant Officer	<ul style="list-style-type: none"> ● Engineers ● Computer Scientists, ● Human Factors Expert ● Rehabilitation Scientist ● Statistician ● Clinical Research Assistants
Facilitators identified	<ul style="list-style-type: none"> ● Clear communication rules ● Shared decision-making ● Shared knowledge of diagnosis and device ● Recognizing the knowledge and experience of the AT prescriber and AT technician 	<ul style="list-style-type: none"> ● Shared knowledge and information ● Obtaining new knowledge and tools ● Different funds of knowledge about PWDs, which together could support the use of AT... 	<ul style="list-style-type: none"> ● Careful Planning ● Familiarity with team members ● Development of a shared understanding ● Appreciation of significant outcomes from multiple perspectives
Barriers identified	<ul style="list-style-type: none"> ● Poor Chemistry among professionals ● Planning problem (time efficiency) ● Reimbursement issues ● Non-adequate location for try-outs 	<ul style="list-style-type: none"> ● Problems in understanding each other ● Different focuses of technology among professions ● Differing views about who is responsible for solving the client's problems 	None mentioned

is not a part of their responsibilities¹¹. The participant, however, claimed that although AT prescription is not within their immediate responsibility, they still communicate problems surrounding AT with the occupational therapist. This sense of unequal accountability on the stakeholder's optimal health can negatively affect service delivery as it perceives the patient according to the different problems rather than holistically.

Lack of a Unified Language. The lack of a standardized and shared language can greatly affect collaboration between professionals.⁹ Interpretation of professional language poses a challenge to the other members of the team, affecting the efficiency and interaction among professionals and collaboration on goal setting.¹⁴ Additionally, terminologies for AT are inconsistent, leading to further difficulties in communication and translating evidence into practice.²⁰

Gaps in Bureaucratic Support. There are notable difficulties arising from IPC within AT provision, such as logistical, administrative, and financial impairments, exemplified by the need for adequate reimbursement processes and redundancy, among others.⁹ De Laat and colleagues proposed performing shared evaluation procedures and improving record storage and retrieval system by using digital means to address the challenges they identified⁹. However, reimbursement issues are harder to address, as these involve policy changes.

DISCUSSION

The studies provided a glimpse of the facilitators and barriers that influence the uptake of IPC in the field of AT within rehabilitation medicine. These facilitators must be utilized, while barriers must be minimized in order to pursue ideal AT service provision.

A means to achieve this is by establishing a mindset early on by integrating interprofessional education (IPE) into existing curricula. IPE prepares professionals to collaborate and interact with colleagues while maintaining their identity during service delivery. This is in line with the recommendations of Frenk and colleagues, who suggest that a reformation of

education will promote more effective and efficient collaborative relationships.¹⁶ Attitudinal and administrative changes through the pursuit of professional development in terms of AT and IPE, as well as equipping future professionals with core competencies of IPC is recommended.

As a lack of unified language impedes IPC in AT provision, the International Organization for Standardization (ISO) released a classification and terminology of AT and products. At present, the most updated version is ISO 2016:9999.¹ However, contrary to its intention to unify the language, it is a paid document, thereby limiting its accessibility. To strengthen IPC in AT provision, there is a need for professionals to have opportunities to be educated on a shared language. It is recommended for organizations to exert further initiative to implement this on an institutional scale through primer courses.

In relation to a unified language, there is also a need for an internationally recognized standard in AT provision. de Witte and colleagues recommended the establishment of such to promote high-quality, accessible, and affordable AT.²¹ They propose that a standardized method provides data that can be used to assess policy impact and assessment. With an internationally recognized process, the AT provision process is optimized, leading to the promotion of professional cooperation, client-centeredness, and the use of pre-intervention strategies, which can potentially impact the AT service needed.

Additionally, it is recommended to enact organizational changes by utilizing the virtual context in data management and communication and optimizing service by removing redundant procedures to maximize limited resources.

Recommendation for further research.

Further research regarding IPC in the context of AT is recommended to explore the extent of influence of each factor. Subjective accounts on the experiences of major stakeholders, especially from differing cultures without established medical and social insurance schemes, also necessitates exploration.

Limitations. As the alternative terms were unilaterally agreed upon by the authors, there may have been some lapses in identifying key terms. Furthermore, critical appraisal of retrieved articles was not done as it is beyond

the established scope of the review. Articles that were irretrievable due to limited resources might have also provided more information. A list of such articles is provided in the Appendix.

CONCLUSION

AT is a major healthcare component hindered by multiple factors, remediable with the application of effective IPC. Optimal work culture, professional competence, and a sense of membership will facilitate and optimize the synergy of AT and IPC. Efforts should be made to limit the influence of barriers, such as the lack of unified language, a silo mentality, and the gaps in bureaucratic support. Nonetheless, the retrieved studies have shown that the influence of IPC in the field of AT justifies the need for further research to identify ideal systems for efficient AT service delivery.

Individual author's contributions

DPGY searched, analyzed, and wrote the paper; KMBB searched, analyzed, and co-wrote the paper; TNHS searched, analyzed, and co-wrote the paper; KI Supervised the research providing critical discourse and arguments during analysis process.

Disclosure Statement

The authors have nothing to disclose. This work was not funded by any agencies/ organizations

Conflicts of interest

All authors declare no conflict of interest.

Acknowledgment

We would like to acknowledge the 2nd Asia-Pacific Interprofessional Education and Collaboration Conference and its organizers for providing us the venue to share the results of this endeavor.

Supplementary Material

[Supplementary Material A. Appendix](#)

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