



# Allied health workers' role in patient education in the United States: a narrative review

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## ABSTRACT

**Introduction:** Patient education (PE) has been traditionally seen as the role of nurses and physicians, while allied health workers (AHWs)-who make up the biggest population of the US healthcare workforce-are sometimes reduced to providing supportive roles. This article reviews the available literature on the role of AHWs in providing PE in the US.

**Methods:** This review was based on a search of the databases Academic Search Ultimate; Health Source-Consumer Edition; Health Source-Nursing/Academic Edition and MEDLINE initially conducted between January 10 and February 3, 2021, and later re-done between December 20 and December 22, 2021. This review applied guidelines for narrative reviews (Ferrari 2015). The search looked at papers published between 2001 and 2021, which discussed allied health professions relevant to the US health system.

**Results:** The review derived 18 articles from the search and two articles from the reference lists of the 18 articles. The review found that AHWs seldom performed PE, although the profession of physical therapy made efforts to formalize participation in PE. It also found that expansion of roles for AHWs was warranted, although additional training may be required to develop effective PE competencies among AHWs. Finally, it found existing challenges such as interprofessional rivalries and time limitations that affected the incorporation of AHWs in PE.

**Conclusions:** AHWs have untapped potential to contribute more to the US health system through delivery of effective PE. Policy adjustments are needed to maximize the input of AHWs in PE. Increased interprofessional collaboration in the US health system is needed to facilitate the extension of PE roles to AHWs. Further research is needed to better understand the factors limiting AHWs' involvement in PE.

**Keywords:** Allied health workers; healthcare; patient education; role; teaching; united states

## INTRODUCTION

Patient education (PE) is an important part of healthcare services as it provides patients with the knowledge to take care of themselves (1). It is a broad set of interventions comprising methods such as patient teaching and behavior modification to influence patients' illness experiences, knowledge, and behavior (2). Health workers actively participate in educating patients, and health worker cadres such as nurses do this with more regularity as PE is typically part of their job descriptions. For example, Wickham (2017) observed that the role of "patient educator" was one of the most essential roles played by nurses (3). Furthermore, Yen (2018) observed that nurses spent an average of 29.9 minutes per shift on communicating health education messages to patients (4). Nurses are therefore key players in the provision of PE.

However, not all health professions have been widely researched on in terms of participation in PE. A disproportionate research interest in PE performance exists, with most researchers concentrating on the PE performance of nurses and physicians (5). Most PE researchers have ignored the efforts of allied health workers (AHWs), who are defined as health professionals from a wide range of disciplines outside of medicine or nursing (6). The shortage of literature on the involvement of AHWs in PE is therefore evident.

The inadequacy of research interest and the lack of role clarity on AHWs in PE contribute to limited understanding about the degree to which AHWs are or should be involved in PE. The intrinsic differences in the non-allied health professions of nursing and medicine compared to the allied health professions may imply key differences in the PE participation experiences of AHWs compared to nurses and physicians. As Spelis observes, nursing teams' 24-hour presence on patients' bedsides gives them more opportunities to teach patients thoroughly (6). AHWs lack this opportunity and hence their provision of PE has a different context from that of nurses. As noted by Kumar, there is

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untapped potential for allied health research in helping to grow the body of evidence on AHW utilization that can help to improve healthcare service delivery (7). Therefore, the paucity of studies relating to AHW-led PE and the difference in the scope of nursing and allied health professions necessitate knowledge-creation on the unique mechanisms through which AHWs deliver PE interventions.

AHWs are a diverse group of healthcare workers that conduct a variety of tasks to support patients' diagnosis, recovery, and quality of life (8). The professions classified under allied health vary in different jurisdictions. In the US, the commonest allied health professions include physical and occupational therapy, clinical laboratory technology, radiologic technology, respiratory therapy, optometry, and dietetics (5). AHWs take on diverse roles that reflect a wide range of pathways and varieties of settings (8).

AHWs make up about 60% of the US workforce and their contributions need to be leveraged maximally (6). Exposure of patients to allied health-led PE can increase channels through which patients encounter health education. Fereidouni et al. recommend provision of PE in healthcare circles with every possible opportunity (9). On another note, Marcus contends that effective PE interventions require multidisciplinary approaches (10). With AHWs constituting a large proportion of the US healthcare workforce and with the evident potential of the AHW professions to improve PE delivery through multidisciplinary approaches, the need to leverage the efforts of AHWs in providing PE is pronounced. It is, therefore, crucial to understand the existing patterns of involvement in PE which AHWs depict. This literature review was conducted to derive an understanding of the role of AHWs in PE in the United States and to subsequently identify research gaps on this topic. Therefore, this article explores the role of AHWs in PE in the United States. It looks at both how they generally fit into the US healthcare system and how they specifically fit into PE roles.

## METHODS

This review was conducted using guidelines for narrative reviews (Ferrari 2015) (11). A literature search was performed across four databases: Academic Search Ultimate; Health Source-Consumer Edition; Health Source-Nursing/Academic Edition and MEDLINE. According to Bramer et al. (2017), literature searches should use at least four databases due to the availability of too many databases and the complexities of managing data from multiple databases (12). Atkinson and Cipriani (2018) add that MEDLINE is the standout database which must always be included in health-related literature searches (13). The search was not limited by study type.

Aside from the three main concepts of focus (*role*, AHWs and PE), their synonyms were used to maximize the returns on search results. The synonyms for *role* were *responsibility*, *function*, *task*, and *duty*. The synonym for AHWs was *allied health professionals* and the synonyms for PE were *health education* and *patient teaching*. Hence the search strings were: (1) *Role AND allied health* (2) (*Role OR responsibility OR function OR task OR duty*) AND (*"allied health" work\* OR "allied health" profession\**) (3) *"Allied health" AND health*

*educat\** (4) (*"allied health" work\* OR "allied health" profession\**) AND (*"health educat\*" OR "patient teaching"*).

The search initially produced 29,446 articles. A filter was applied to limit results to papers written in the English language. After the application of this filter, the results were reduced to 25,013. Further filters were applied to limit the search results to research articles (hence removing reports and other non-research articles). This reduced the results to 14,075. These articles were checked to ensure that they had at least one of the following combinations of key concepts: (i) *role* and AHWs (ii) AHWs and PE; or (iii) *role*, AHWs and PE.

The vast majority of articles did not cover these concepts in these combinations, hence they were removed due to not being sufficiently relevant to the discussion. This resulted in 4109 articles remaining. These articles were further checked to ensure that they discussed professions that were recognized as allied health professions in the US. Articles discussing professions that did not exist as recognized allied health professions in the US, and which did not specify the allied health professions which they examined, were disqualified. Here, 935 articles were left. These articles were further checked for relevance by reading their abstracts.

Most of the remaining articles discussed the concepts of *"allied health work"* and *"education"* in terms of the educational background of AHWs rather than educational interventions directed towards patients, and they were excluded from the review.

Hence, apart from being written in the English language, the inclusion criteria were:

- Article containment of relevant combinations of key concepts
- Article focus on the US health system or focus on allied health professions outside the US which also existed in the US (to avoid including out-of-context articles since some allied health professions are unique to certain countries)
- Article focus on education as an allied health intervention, not the educational background of AHWs. These criteria are listed in Table 1.

After careful application of these measures, 18 articles were included. Table 2 lists the 18 articles primarily identified

**TABLE 1.** Article inclusion/exclusion criteria

Article inclusion criteria	Article exclusion criteria
1. Article discussion of at least one of the following combinations of key concepts: a. Allied Health Workers and Role b. Allied Health Workers and Patient Education c. Allied Health Workers, Role and Patient Education.	1. Articles only discussing <i>Patient Education</i> and <i>Role</i> outside of the allied health workers context (such as those discussing the patient education role of nurses).
2. Article focus on allied health professions in the US health system or on allied health professions outside the US, but also in existence in the US.	2. Articles discussing allied health professions from outside the US, and with no existence in the US.
3. Article focus on education as an allied health worker-driven intervention.	3. Article focus on <i>education</i> in terms of the educational background of allied health workers.

**TABLE 2.** Articles sourced from the database search

Author (s)	Purpose of the Article	Study Design	Methods	Results
King et al. (2019).	To explore the interprofessional role dynamics of a group of practitioners, who adopt a common role and title to create a professional identity.	Exploratory research	Interviews	Diabetes education was found to be considered a sub-specialty of nursing only; access to education and credentialing was restricted for allied health; professional stereotypes existed.
Bradd et al. (2017).	To identify literature on application of practice development by allied health workers.	Narrative review	Search of relevant databases; search of the <i>International Practice Development Journal</i> .	Areas of focus for most authors: enhanced multidisciplinary teamwork; practice development frameworks and principles; practice development education and learning programs; and clinical quality improvement and service delivery outcomes
Chapman and Blash (2017)	To describe new roles for medical assistants (MAs) in care models.	Case studies	Thematic analysis	New MA roles included health coach, medical scribe, dual role translator and health navigator. Implementation of new roles required extensive training.
Philip (2015)	To discuss the factors inhibiting the maximal utilization of allied health workers' potential in Australia	Narrative Review	Search of relevant databases	Overdependence on the traditional medical model of healthcare delivery prevents maximal utilization of allied health workers' potential
Saxon, Gray and Oprescu (2014)	To review the evidence on the impact of extended allied health worker roles on improving health service quality.	Systematic review	Search of relevant databases	Extended scope practice allied health practitioners could be a cost-effective and consumer-accepted investment that health services can make to improve patient outcomes.
Stute (2014)	To explore the effect of increased role clarity on utilization of allied health assistants.	Pilot Study	Implementation and auditing of new allied health assistant positions.	Both the full (standard) scope and the advanced scope positions were warranted, but the skills of the allied health assistants were not optimally utilised.
Stanhope and Pearce (2013)	To determine the effectiveness and implementation of advanced allied health assistant roles.	Systematic review	Search of relevant databases and Google Scholar.	Numerous challenges exist in integrating advanced allied health assistant roles into existing health systems.
Alexander et al. (2012)	To identify educational strategies used by physical therapists in promoting healthy behaviour change.	Scoping systematic review	Search of relevant databases; research mining.	Studies focused on educational theories used, timing of education, delivery method and session structure.
Lambert (2012)	To discuss the role of allied health workers in end-of-life medical decision making.	Narrative review	Search of relevant databases	Allied health workers ought to be utilized more in end-of-life medical decision making due to their closer patient contact than physicians.
Spelis (2012)	To assess the knowledge, skills and attitudes of allied health workers and nurses toward patient and family teaching.	Survey	Questionnaire	Opportunities may exist to improve the training of health care workers in patient and family teaching techniques. Opportunities also exist to clarify the roles of health care workers in the process of patient teaching.
Needle et al. (2011)	To evaluate evidence relating to the current health promotion activities of UK-based allied health professionals.	Systematic Review and Narrative Synthesis	Search of relevant databases and journals	Physiotherapists are the most active allied health group in performing health promotion activities in the UK. Speech therapists, dietitians, podiatrists, art therapists and occupational therapists also participate in health promotion. There was no literature to support the involvement of allied health workers like paramedics, orthoptists and optometrists in health promotion in the UK.
Doggrell (2010)	To determine whether interventions by allied health professionals improved adherence to medicines in diabetics.	Narrative review	Search of relevant databases	Studies had inconsistent results. Some showed positive relationships between allied health workers' educational interventions and increased adherence, while others showed no correlation.
Kumar (2010)	To describe the process of research capacity building in allied health.	Narrative review	Search of relevant databases	Getting allied health workers to actively conduct research is unrealistic. It is more practical to get all allied health workers to incorporate research findings in their work.

(Contd...)

**TABLE 2.** (Continued)

Author (s)	Purpose of the Article	Study Design	Methods	Results
Taal et al. (2006)	To review the treatments and their efficacy as provided by allied health professionals in rheumatoid arthritis care.	Narrative review	Search of relevant databases	Allied health professionals have significant roles in the care of rheumatoid arthritis patients, including health educational roles.
Brown et al. (2004)	To assess awareness and needs concerning inadequate health literacy among allied health professionals.	Survey	Questionnaire	Less than a third of allied health professionals knew about issues in health literacy, including impact of inadequate health literacy on patient care.
Cabana et al. (2004)	To assess collaborative practices on asthma education among physicians and allied health workers.	Survey	Questionnaire	64% of practices used collaborative patient education approaches involving physicians, nurses and allied health workers. Physician-only patient education approaches were used in 36% of practices.
Karges (2003)	To examine the practices and beliefs related to patient education among Physical therapists in South Dakota.	Survey	The Principles of Adult Learning Scale and a questionnaire.	Barriers existed that prevented physical therapists from implementing learner-centered patient education.
Gahimer and Domdolt (1996)	To investigate the amount and perceived effects of informal patient education in physical therapy practice.	Survey; participant observation	Questionnaires; recordings	Physical therapists' teaching behaviors rarely corresponded to their perceptions of their own teaching or to their patients' or supervisors' perceptions.

through the systematic process and they include exploratory studies, narrative reviews, systematic reviews, pilot studies, and surveys. Key additional literature (amounting to two articles) was sought from the reference lists of the 18 articles to broaden the discussion. The articles extracted from reference lists were identified due to their relevance in broadening the scope of this paper and were not found using the same search criteria as the 18 articles. Hence, these additional articles are listed in a separate table (Table 3) for clarity.

In summary, the literature search process was as follows: Identifying concepts and synonyms; developing search "strings" (search phrases); searching the databases; applying search filters; applying inclusion/exclusion criteria and article selection. This process was conducted by the primary researcher, WM.

The articles were classified based on article type (empirical versus narrative reviews versus systematic reviews).

Data analysis was conducted by synthesizing the main findings and arguments presented by each study. Themes were constructed using a descriptive approach involving identification and summarization of frequently occurring concepts derived from the main findings of each included study. No reporting guidelines were used since Ferrari (2015) states that there are no acknowledged guidelines for narrative reviews (11).

## RESULTS

This section discusses the results obtained from data analysis of the articles. The 18 articles primarily selected systematically are listed in Table 2 at the index of this paper. Of the eighteen articles, six articles were narrative reviews, four were based on surveys, three were systematic reviews. There was also one exploratory study, one case study, and one pilot study. One article combined a systematic review and narrative synthesis while another combined a survey and participant observation. Table 4 at the index of this paper summarizes the articles by type.

The results are categorized into five themes, namely: *The role of AHWs in healthcare in the US*, *Role-extension for AHWs*, *PE: How AHWs fit in*, *PE and practice development in allied health*, and *Other notable issues in PE*.

### The role of AHWs in healthcare in the US

The concept of role in relation to AHWs has been discussed from different points of view. Stute et al. (2014) noted that the uptake and utilization of AHWs were variable across disciplines and jurisdictions, with limited agreement on the roles of AHWs or how to define these roles (14). According to the same author, there was consensus in the healthcare circles regarding the role and scope of lower-level allied health positions, but consensus was not reached for higher-level allied health positions and clinical roles (14).

On a different note, Needle et al. (2011) noted that role-flexibility and extension of roles across professional and organizational boundaries had been key points of emphasis in allied health work (8).

Philip (2015) went on to argue AHWs were an underutilized resource (15). Chapman and Blash (2017) shared similar observations, citing a growing acknowledgment that the healthcare workforce did not maximize each profession's unique skills and training (16).

### Role extension for AHWs

Stanhope and Pearce (2013) define AHW role extension as the addition of roles to the expected roles of AHWs that are outside the traditionally recognized scope of practice of AHWs (17). A good example of this was demonstrated by Lambert (2012), who discussed the idea of extending AHWs' skill sets to incorporate the role of assisting patients with end-of-life medical decision-making, a task conventionally performed by nurses (18).

An ongoing transition is seen in US healthcare services from acute services to wellness-focused services (19). This change requires that health workers have dynamic skill sets and equipping AHWs with PE skills can be one way of



**TABLE 3.** Additional articles sought from reference lists

Authors	Purpose	Study design	Methods	Results
Marcus (2014)	To study verbal instruction as a component of patient and family education and make recommendations for best practices for healthcare providers.	Literature review	Search of relevant databases	Verbal education models, best practices, and needs to improve verbal patient education were identified.
Pozniak et al. (2010)	To investigate physicians' perceptions of the adequacy of reimbursement, and its effect on their treatment of diabetic patients.	Survey, discussion	Questionnaire, discussion tool.	Most physicians were dissatisfied with the reimbursement for some diabetes-related services. They also reported that this caused them to provide incomprehensive diabetes care.

**TABLE 4.** Article classification by type

Article	Article type
King et al. (2019)	Exploratory
Bradd et al. (2017)	Narrative review
Chapman and Blash (2017)	Case studies
Phillip (2015)	Narrative review
Saxon et al. (2014)	Systematic review
Stute (2014)	Pilot study
Stanhope and Pierce (2013)	Systematic review
Alexander et al. (2012)	Scoping systematic review
Lambert (2012)	Narrative review
Spelis (2012)	Survey
Needle et al. (2011)	Systematic review and narrative synthesis
Doggrell (2010)	Narrative review
Kumar (2010)	Narrative review
Taal et al. (2006)	Narrative review
Brown (2004)	Survey
Cabana et al. (2004)	Survey
Karges (2003)	Survey
Gahimer and Doldolt (1996)	Survey; participant observation

meeting this goal (19). There is room to make modifications in the skill sets of AHWs. This was demonstrated in a 2014 systematic review by Saxon, Gray and Oprescu which mentioned that literature supporting AHWs' role-extension existed, although its presence in the most recent publications was limited (20).

In a similar development, Chapman and Blash (2017) found that there were opportunities for possible extension of the roles of medical assistants, although extensive training was needed to enable them to execute their new roles successfully (16). Lambert (2019) also highlighted the intricacies associated with AHW role extension by arguing that successful implementation of such changes may require further credentialing, additional training, competency development, or attainment of significant clinical experience (18).

Another obstacle to AHW role extension was identified by Field (2008), who argued that role extension was easier to achieve at lower levels of organization such as at facility level than at state or federal levels (21). The literature on role extension for AHWs described above is limited to AHW role extension in general.

Few researchers addressing this topic have covered the subject beyond the qualitative level. A survey by Spelis (2012) introduced a quantitative dimension to the discussion. It

found that 91.2% of nurses and 88.2% of AHWs believed that patients understood the contents of AHW-driven PE (5). However, there was a more marked difference in beliefs about responsibility for providing PE, with 98.7% of nurses perceiving PE as a core responsibility of their job and only 84.9% of AHWs accepting responsibility for providing PE. The study did not attempt to analyze the reasons behind this discrepancy.

In a different development, Cabana et al. (2004) found that only two-thirds of medical practice firms involved AHWs in PE activities (22). They also found that 81% of pediatricians favored collaborative PE approaches with nurses and allied health staff. However, in practice, only 64% of health facilities used such a collaborative approach to teaching patients about asthma. The study had insufficient sample sizes to draw any meaningful correlations between physician attitudes on collaborative PE and the practical implementation of the same. It, therefore, did not attempt to analyze the reasons behind the lower rates of utilization of AHWs in asthma education in practice.

While low collaboration in PE delivery is likely multifactorial, some studies provide hints into the political aspects that may obstruct AHW role extension. One of those studies was done by King et al. (2019), who explored the problems faced by diabetes educators with allied health backgrounds in attaining certification and recognition. The study found that access to credentialing among diabetes educators favored nurses but disenfranchised AHWs. This study did not name the specific professions of the AHWs that were studied (23). The study also mentioned the presence of inter-professional rivalries or "turf wars." This involved non-allied health professionals feeling uncomfortable with AHWs performing PE tasks (23). They perceived the AHWs as overstepping their professional boundaries by delivering PE. These perceptions stemmed from stereotypes posed against educators from the allied health backgrounds (23). The study did not mention how these "turf wars" varied in relation to variations in the roles performed.

Aside from the individual factors, other discussions have looked at the organizational aspects of PE-related role extension for AHWs. For instance, a study by Brown et al. (2004) found lack of systemic structures within health systems to support AHWs in attaining health literacy skills necessary for communicating instructions to patients (24).

This indicates that the process of role extension for AHWs is also faced with organizational-level challenges apart from individual-level challenges.

### PE: How AHWs fit in

Not all allied health professions in the US conduct PE consistently or have proper PE-related professional guidelines (5). The expectation to provide PE as postulated by professional practice standards is variable for the different allied health professions (25). Bastable and Gramet (2010) echo this observation, noting that the professions of pharmacy, physical therapy (PT), and dietetics in the United States were among the few allied health professions which published formal documents on the role of their professions in PE as early as the 1970s (26).

Out of these professions, the PT profession stands out, having considered PE as one of its integral components for a long time (26). The relationship of the PT profession to PE has also been well evaluated in literature (26).

Alexander et al. (2012) assessed PTs' teaching approaches, concluding that the most used approaches were visual models, handouts/brochures, one-on-one sessions, and skills training (27). King et al. (2019) followed up on that and found that none of the studies on education provided by PTs included measures for evaluating the effectiveness of the PE provided (23).

There is limited literature on the depth of pre-qualification instruction in PE methods among many allied health fields, as much of this literature has focused on assessing nursing curricula. However, some studies indicate that pre-qualification PE preparation may be low in allied health. Bastable and Gramet estimate that only 34% of PTs are prepared in PE concepts during their course of studies (26).

Taal et al. (2006) deviated from profession-specific discussions and brought a different dimension to the subject, acknowledging the importance of AHW-led PE in potentially encouraging adherence to treatment plans. They also recommended the use of structured educational programs as means of empowerment and enhanced coping for arthritic patients (28).

The effectiveness of AHW-led PE is another topic that some researchers have focused on. An attempt to document the effectiveness of PT-led PE was made in a 1996 report by Gahimer and Domdolt, which suggested that only 29.7% of patients reported positive health changes attributable to PE provided by PTs (29). More recently, other researchers have gone beyond assessing PT-led PE and included other allied health professions in their analyses. One example of these researchers is Doggrell (2010) who examined the correlation between multiple AHW professions' educational interventions to diabetics and the diabetics' medication adherence. No correlation was found between education and adherence, and these results did not vary according to the AHWs' cadres (30).

### PE and practice development in allied health

Practice development relates to the implementation of the adjustment of roles among AHWs. Bradd et al. (2017) defined practice development as a facilitated process aimed at promoting person-centered and evidence-based healthcare (31).

Marcus (2014) observed that hospitals had the responsibility to train their staff in PE to sharpen their PE skills while on the job (10). Barber-Parker (2002) had made a similar

point, suggesting that many health workers' PE skills could primarily be developed through experiential means (32). Even more evidence for the reliability of practice development is seen in the work of Karges (2003), who found that PTs gained improvements in PE skills through practice rather than through didactic approaches (33). Therefore, most researchers seem to be in favor of the practice development model as a way of improving PE skills among AHWs.

### Other notable issues in PE

Several researchers have discussed challenges involved in allied health-led PE. Pozniak et al. (2010) noted that provider reimbursement for diabetes services in the US was inadequate in comparison to the efforts invested by health providers in PE (34). This may demotivate health workers from providing PE, as they may perceive PE efforts as unrewarding (34).

Another key issue in PE is the lack of PE-related competencies. According to Bastable and Gramet (2011), few health workers have solid academic grounding enabling them to teach patients (26). In a related development, Kumar (2010) noted lack of consistency in the impartation of skills to AHWs as a drawback to AHW services (7). This may be linked to inconsistent PE skillsets among AHWs, limiting their ability to provide effective PE.

Bastable and Gramet also note that time constraints prevent AHWs from effectively carrying out educational roles within demanding and restrictive schedules (26).

## DISCUSSION

PE is an integral component of healthcare practice as it provides patients with important information for improving or maintaining their health (35). PE in clinical settings is primarily delivered by non-allied healthcare workers, but AHWs are also involved to varying degrees (5). While there is ample literature discussing nurse-led PE, this review found very few relevant articles on allied health-led PE, indicating shortage of literature on PE as delivered by AHWs.

The uptake and utilization of AHWs in the provision of PE have been variable and inconsistent due to the lack of universal consensus on the roles of AHWs across the US (14). This observation implies that AHWs in some states may have broader roles while those in other states may have narrower roles.

The lack of consensus regarding appropriate roles especially for higher-level allied health practitioners may be clues to the complexities involved in defining AHW roles that require higher responsibilities. The attestations by various researchers about AHWs being an underutilized resource demonstrate the need for role re-definition (including role extension) for AHWs. This is central to any attempts at maximizing AHWs' contributions to healthcare services.

As acknowledged in the cited literature, role extension provides AHWs' with skill sets to perform tasks they are not conventionally associated with (16). These new and unfamiliar AHW roles may come with adaptation challenges, but successful adaptation to these extended roles could help shape AHWs' skills and improve their contributions

to healthcare service delivery. Since various studies have confirmed that role extension for AHWs is feasible (16), health policymakers ought to place emphasis on designing appropriate post-qualification training programs that can equip AHWs with commensurate skills for performing extended roles.

AHWs perform a wide variety of functions and there are many different categories within the AHW umbrella of professions (5). The available literature on role extension for AHWs has been too broad and has not considered the need to distinguish between technically focused allied health disciplines (such as radiography) and therapy-focused ones (such as medical social work). Since these professions have key differences in patient interaction approaches, it is likely that these two different categories of AHWs deliver PE in contrasting ways. Therefore, the approaches to role extension for AHWs need to consider the specific attributes of the involved professions.

Spelis (2012) showed that most nurses and AHWs had confidence in AHW-led PE, although fewer AHWs accepted PE performance as being their primary responsibility (5). Similar findings had been earlier demonstrated by Cabana (2004) who demonstrated the high prevalence of approval among physicians regarding collaboration with AHWs (22), although far fewer physicians practiced such collaboration. Further studies are needed to attempt to explain this discord.

Future studies in this area also need to go beyond the "AHWs versus nurses" narrative and compare PE attitudes and skills between and among the various allied health professions themselves. This research gap is one of the most important findings of this review as it has the potential to inspire a change in focus from the practice of assessing AHWs in a generalized way to a more profession-specific research approach. This is a necessary approach given the wide variations in allied health disciplines.

The issue of interprofessional "turf wars" between AHWs and non-AHWs may compromise efforts to deliver PE collaboratively. Resistance by non-AHWs to accept AHWs as useful patient educators may hamper collaborative PE provision. There is thus a need for other health-care workers to accept that AHWs have an important role in PE. This can improve health system efficiency by sharing the task of providing PE among a wide range of allied and non-AHWs. Collaboration in PE provision could also help maximize patients' exposure to health information at every encounter with the health system, potentially leading to improved health outcomes. It could also possibly increase AHWs' morale by making them feel valued as key members of the healthcare team.

On a different note, researchers need to fill the existing knowledge gap concerning the nature of the interprofessional "turf wars," as the mechanisms through which these "turf wars" play out are currently unclear. The available literature on this topic has not been described whether these "turf wars" vary based on the interprofessional roles involved. For instance, it is not understood how nurses would respond to respiratory therapists being given some nursing-associated roles such as administering medications, versus respiratory therapists being assigned other

nursing-associated roles such as PE roles. There is also no clarity on which AHWs are more involved in these "turf wars," and to what extent. Further scholarship is needed to provide more understanding on this.

Evidence shows that PT is the most exceptional allied health profession in terms of PE performance, having been at the forefront in advancing PE mandates. However, even PT itself as a profession needs to improve on its output of PE training among its students. Still, the developments in PT show that integrating PE in the allied health professions is possible.

On another note, there is a shortage of evaluative studies to assess the impact of AHW-led PE. One of the few studies in this area was conducted by Doggrell (2010), who showed no improvement in medication adherence following PE delivered by AHWs. Since that study did not use non-allied healthcare workers as a comparison group, it is unclear if the ineffectiveness of these educational interventions was related to lack of PE skills on the side of AHWs (30).

The practical aspects of equipping AHWs with PE performance attributes constitute a fundamental area of study. Many authors agree that it is possible to instill PE skills into AHWs after qualification even if they did not attain them in training. This should be seen as an opportunity by health policymakers to develop PE competences among AHWs who had deficient pre-qualification PE training. Health policymakers should draw motivation from this opportunity and devise PE development initiatives among AHWs.

Inconsistency in provider reimbursement for PE activities is another important factor which draws back PE efforts in the US (34). In the highly privatized and insurance-based US healthcare system, there would likely be limited incentives for providers to deliver comprehensive PE activities when such activities attract inadequate compensation. Health insurance companies may need to address this if PE-intensive healthcare services are to be sustained.

Shortage of time is another factor that inhibits the delivery of high-quality PE by AHWs (26). While most health workers generally have limited time (26), most AHWs may have even lesser interaction times with patients as compared to their counterparts in professions like nursing. It may be difficult for AHWs with their limited patient interaction opportunities to use most of that time in PE activities such as teaching rather than in providing other services which may be perceived as more rewarding or as having more direct positive health effects. AHWs could maximize their limited patient interaction times by devising customized PE approaches ideal for limited-time scenarios.

This review utilized the four databases mentioned earlier due to their depth in terms of the content relevant to the purposes of this review. The authors believe that they captured a wide variety of relevant resources by using these databases. One of the strengths of this review is that it has not been limited to specific study types. Hence, it has captured publications utilizing varied approaches such as exploratory studies, narrative reviews, systematic reviews, pilot studies, and surveys.

Leaving out many studies from outside the US can be seen as either a strength or a weakness of this review. It can be considered a strength in that it allowed for capturing only



the most relevant articles since allied health professions have different definitions and contexts in different countries. However, this can also be seen as a limitation given that it did not provide a comparative analysis between the US system and other countries. Another limitation is the fact that this review only used papers written in the English language; hence, it may have excluded relevant work published in other languages.

Finally, another limitation of this paper is the lack of a tool for ranking the quality of the articles included in the review. Due to time constraints and other limitations, the authors of this review did not come up with a tested tool for classifying the included articles by level of methodological rigor.

## CONCLUSION

PE is an integral component of healthcare practice, providing patients with important information for improving and maintaining their health. PE in clinical settings in the US is primarily delivered by non-allied healthcare workers, but health workers (AHWs) are also involved to varying degrees. The manner of involvement of AHWs in PE varies according to the cadres and skill sets of the involved allied health professionals, organizational factors, and time factors. AHWs from some categories are not well-equipped to competently provide PE, but opportunities exist to improve their capacity to provide it. Of the few studies focusing specifically on AHW-driven PE, most have ignored the inherent disparities between the various allied health professions. Future studies need to consider these factors.

## AUTHORS' CONTRIBUTIONS

Conceptualization: WM. Data curation: WM. Formal analysis: WM. Funding acquisition: not applicable. Methodology: AP, WM. Writing—original draft: WM. Writing—review and editing: KG, AP, PA, EP, WM.

## CONFLICT OF INTEREST

The authors declare no conflict of interest that could influence this work.

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## REFERENCES

- Glanz K, Rimer B, Viswanath K. *Health Behavior and Health Education Theory, Research and Practice*. 4th ed. San Francisco: Jossey-Bass; 2008.
- Engers A, Jellema P, Wensing M, van der Windt DA, Grol R, van Tulder MW. Individual patient education for low back pain. *Cochrane Database Syst Rev*. 2008;2008(1):CD004057. <https://doi.org/10.1002/14651858.CD004057.pub3>
- Wickham S. Are nurses educated to educate? *JOJ Nurs Health Care*. 2017;2(1):104-6. <https://doi.org/10.19080/JOJNHC.2017.02.555577>
- Yen PY, Kellye M, Lopetegui M, Saha A, Loversidge J, Chipps EM, et al. Nurses' time allocation and multitasking of nursing activities: A time motion study. *AMIA Annu Symp Proc*. 2018;2018:1137-46.
- Spelis M. *Are Health Care Professionals Ready to Teach? The Knowledge, Skills and Attitudes of Hospital Health Care Professionals Related to Patient and Family Teaching [Dissertation]*. Ann Arbor, Michigan: University of California, Davis; 2012. Available from: <https://www.proquest.com/docview/1112071870/AB1301CAE6604722PQ/1?accountid=9054>
- Jones RA. Patient education in rural community hospitals: Registered nurses' attitudes and degrees of comfort. *J Contin Educ Nurs* 2010;41:41-8. <https://doi.org/10.3928/00220124-20091222-07>
- Kumar S. Building research capacity in allied health: New decade, new challenges and new opportunities. *Int J Allied Health Sci Pract*. 2010;8(2):3. Available from: <https://nsuworks.nova.edu/ijahsp/vol8/iss2/3/> [Last accessed on 2022 Jan 07].
- Needle J, Petchey R, Benson J, Scriven A, Lawrenson J, Hilari K. *The Allied Health Professions and Health Promotion: A Systematic Literature Review and Narrative Synthesis-final Report*. NIHR Service Delivery and Organisation Programme; 2011. Available from: [https://www.researchgate.net/publication/23617518\\_The\\_allied\\_health\\_professions\\_and\\_health\\_promotion\\_a\\_systematic\\_literature\\_review\\_and\\_narrative\\_synthesis](https://www.researchgate.net/publication/23617518_The_allied_health_professions_and_health_promotion_a_systematic_literature_review_and_narrative_synthesis) [Last accessed on 2021 Dec 18].
- Fereidouni Z, Sarvestani RS, Hariri G, Kuhpaye SA, Amirkhani M, Kalyani MN. Moving into action: The master key to patient education. *J Nurs Res*. 2019;27(1):1-8. <https://doi.org/10.1097/jnr.000000000000280>
- Marcus C. Strategies for improving the quality of verbal patient and family education: A review of the literature and creation of the EDUCATE model. *Health Psychol Behav Med*. 2014;2(1):482-95. <https://doi.org/10.1080/21642850.2014.900450>
- Ferrari R. Writing narrative style literature reviews. *Medical Writ*. 2015;24:230-5. <https://doi.org/10.1179/2047480615Z.000000000329>
- Bramer W, Rethlefsen M, Kleijnen J, Franco O. Optimal database combinations for literature searches in systematic reviews: A prospective exploratory study. *Syst Rev*. 2017;6(1):245. <https://doi.org/10.1186/s13643-017-0644y>
- Atkinson L, Cipriani A. *How to Carry out a Literature Search for a Systematic Review: A Practical Guide*. Cambridge: Cambridge University Press; 2018. Available from: <https://www.cambridge.org/core/journals/bjpsych-advances/article/how-to-carry-out-a-literature-search-for-a-systematic-review-a-practical-guide/629E-710311A566E54F951E5E83621122#> [Last accessed on 2021 Oct17].
- Stute M, Hurwood A, Hulcombe J, Kuipers P. Pilot implementation of allied health assistant roles within publicly funded health services in Queensland, Australia: Results of a workplace audit. *BMC Health Serv Res*. 2014;14:258. <https://doi.org/10.1186/1472-6963-14-258>
- Philip K. Allied health: Untapped potential in the Australian health system. *Aust Health Rev*. 2015;39(3):244-7. <https://doi.org/10.1071/ah14194>
- Chapman SA, Blash LK. New Roles for Medical Assistants in Innovative Primary Care Practices. *Health Serv Res*. 2017;52(1):383-406. <https://doi.org/10.1111/1475-6773.12602>
- Stanhope J, Pearce C. Role, implementation, and effectiveness of advanced allied health assistants: A systematic review. *J Multidiscip Healthc*. 2013;6:423-34. <https://doi.org/10.2147/JMDH.S50185>
- Lambert H. The allied health care professional's role in assisting medical decision making at the end of life. *Top Lang Disord*. 2012;32(2):119-36. Available from: <https://eric.ed.gov/?id=EJ977028> [Last accessed on 2021 Jan 20].
- Wood D. *Workforce Trends in Allied Healthcare; 2013*. Available from <https://www.amnhealthcare.com/amn-insights/news/workforce-trends-allied-healthcare> [Last accessed on 2021 Jan 26].
- Saxon RL, Gray MA, Opreescu FI. Extended roles for allied health professionals: An updated systematic review of the evidence. *J Multidiscip Healthc*. 2014;7:479-88. <https://doi.org/10.2147/JMDH.S66746>
- Field RI. Why is health care regulation so complex? *PT*. 2008;33(10):607-8. Accessed from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2730786/> [Last accessed 2022 Jan 19].
- Cabana MD, Slish KK, Brown R, Clark NM. Pediatrician attitudes and practices regarding collaborative asthma education. *Clin Pediatr*. 2004;43(3):269-74. <https://doi.org/10.1177/000992280404300308>
- King O, Nancarrow S, Grace S, Borthwick A. Interprofessional role boundaries in diabetes education in Australia. *Health Sociology Rev*. 2019;28(2):162-76. <https://doi.org/10.1186/s13047-017-0210-9>
- Brown DR, Ludwig R, Buck GA, Durham D, Shumard T, Graham



- SS. Health literacy: Universal precautions needed. *J Allied Health*. 2004;33(2):150-5. Available from: <https://pubmed.ncbi.nlm.nih.gov/15239414/> [Last accessed 2022 Jan 20].
25. Robien K, Levin R, Pritchett E, Otto M, American Dietetic Association. American Dietetic Association: Standards of practice and standards of professional performance for registered dietitians (generalist, specialty, and advanced) in oncology nutrition care. *J Am Diet Assoc*. 2006;106(6):946-951  
<https://doi.org/10.1016/j.jada.2006.03.035>
26. Bastable S, Gramet P. Overview of education in healthcare. In: Bastable S, Gramet P, Jacobs K, Sopczyk D, Braugart M, editors. *Health Professional Educator: The Principles of Teaching and Learning*. Burlington: Jones and Bartlett Learning. p. 24.
27. Alexander J, Bambury E, Mendoza A, Reynolds J, Veroneau R, Dean E. Health education strategies used by physical therapists to promote behaviour change in people with lifestyle-related conditions: A systematic review. *Hong Kong Physiother J*. 2012;30(2):57-75.  
<https://doi.org/10.1016/j.hkpi.2012.07.003>
28. Taal E, Bobietinska E, Lloyd J, Veehof M, Rasker WJ, Oosterveld FG, et al. Successfully living with chronic arthritis. The role of the allied health professionals. *Clin Rheumatol*. 2006;25(2):189-97.  
<https://doi.org/10.1007/s10067-005-1155-0>
29. Gahimer JE, Domholdt E. Amount of patient education in physical therapy practice and perceived effects. *Phys Ther*. 1996;76(10):1089-96.  
<https://doi.org/10.1093/ptj/76.10.1089>
30. Doggrell SA. Does intervention by an allied health professional discussing adherence to medicines improve this adherence in Type 2 diabetes? *Diabet Med*. 2010;27(12):1341-9.  
<https://doi.org/10.1111/j.1464-5491.2010.03137.x>
31. Bradd P, Travaglia J, Hayen A. Practice development and allied health a review of the literature. *Int Pract Dev J*. 2017;7(2):1-22.  
<https://doi.org/10.19043/ipdj.72.007>
32. Barber-Parker ED. Integrating patient teaching into bedside patient care: A participant-observation study of hospital nurses. *Patient Educ Couns*. 2002;48(2):107-13.  
[https://doi.org/10.1016/s0738-3991\(02\)00024-1](https://doi.org/10.1016/s0738-3991(02)00024-1)
33. Karges JR. Patient Education: Physical Therapists' Perceptions Regarding the Use, Effectiveness, and Barriers of Adult Education Principles [Dissertation]. Ann Arbor, Michigan: University of South Dakota; 2003 Available from: <https://www.proquest.com/dissertations-theses/patient-education-physical-therapists-perceptions/docview/305314820/se-2?accountid=29916> [Last accessed on 2021 Jan 18].
34. Pozniak A, Olinger L, Shier V. Physicians' perceptions of reimbursement as a barrier to comprehensive diabetes care. *Am Health Drug Benefits*. 2010;3(1):31-40. Available from: <https://pubmed.ncbi.nlm.nih.gov/25126307/> [Last accessed 2022 Jan 18].
35. Ramos-Remus C, Salcedo-Rocha A, Prieto-Parra E, Galvan-Villegas F. How important is patient education? *Best Pract Res Clin Rheumatol*. 2000;14(4):689-703.  
<https://doi.org/10.1053/berh.2000.0107>