

Understanding the Physical Health Status, Health Literacy, and Health-Related Interventions in School-Based Samples of Youth With Learning Disorders and Emotional Disturbance

Jacqueline Huscroft-D'Angelo, Alexandra L. Trout, Kristen Duppong Hurley, and Stacy-Ann A. January

Abstract: School environments provide an opportunity to address health-related topics and ensure students graduate prepared to manage health needs, including populations at risk for poor physical health or low health literacy, such as those with disabilities. Presently, little is known about the physical health status, health literacy, or approaches to address these topics in school environments for youth with high-incidence disabilities. The purpose of this study was to conduct a comprehensive review of the literature from 1994-2014 to understand the physical health status and health literacy of youth with Learning Disabilities (LD) and Emotional Disturbance (ED) as well as identify approaches to address these topics in school environments. A two-phase systematic process was used to examine the literature in each respective topic. This included identifying search parameters, an electronic database search, ancestor search, and coding of relevant articles. The initial search yielded 130 articles. After coding, 11 articles remained. Eight focused on physical health status, two on health literacy, and one on interventions related to health literacy. Although study results are tentative, youth with LD and ED are likely at risk for poor health outcomes and low health literacy. A need exists to develop school-based approaches that will contribute towards improving these outcomes.

As health care reform continues to be a primary topic of debate in the United States, understanding the physical health status and literacy of different populations is becoming increasingly important. One population at increased risk for poor physical health and health literacy is individuals with disabilities (Huscroft-D'Angelo, Trout, Epstein, & Thompson, 2014; Trout, Hoffman, Epstein, Nelson, & Thompson, 2014; Trout, Lambert, Nelson, Epstein, & Thompson, 2014; 2015). Although studies have examined these constructs in persons with disabilities in the general population, less is known about how physical health status and literacy manifest in school-based populations of youth with high-incidence disabilities, such as learning disabilities (LD) and emotional disturbance (ED). This is important as schools are ideal settings to contribute to the achievement of public health goals by providing students key information on health and graduating students who have strong health literacy skills that will help them lead healthier lives (American Association of School Health [AASH], 2016; Centers for Disease Control and Prevention [CDC], 2016). Understanding the physical health status and literacy of students with school-identified disabilities will also contribute to a comprehensive knowledge base for developing school-based interventions aimed at improving overall health literacy in this population.

Research on youth health-related outcomes has received national attention due to the close association between health and school-related outcomes (Cook, Li, & Heinrich, 2015). Professionals from the fields of health care and education agree that health and school functioning are interrelated. A clear association exists between physical health and academic and behavioral functioning areas in which youth with certain school-identified, high-incidence disabilities present increased

risk (AASH, 2016; Lepore & Kliwer, 2013; Reuben & Pastor, 2013; Trout et al., 2009). For instance, youth with ED are at increased risk for dropout, substance abuse, arrest, mental health difficulties, familial problems, and unemployment (Bradley, Doolittle, & Bartolotta, 2008; Mayer, Lochman, & Van Acker, 2005; Trout et al., 2009; Wagner, Newman, Cameto, & Levine, 2006). Although not as severe, risks associated with school-identified LD are similar to those risks associated with ED. That is, nearly 33% of students with LD have been retained, 19% drop out of school, 50% face disciplinary actions while at school, and up to 55% have been involved with the criminal justice system (Deschler, 2014). Given that youth with LD and ED indicate risk in key areas of school and behavioral functioning, they may also be at increased risk for poor physical health. Presently, a comprehensive understanding of specific school-identified disability groups and their overall physical health status is lacking. It is imperative to address this gap, given the relationships among health status, implementing healthy behaviors, future employment, and social stability in adulthood and to advance the national agenda on this topic (Lee, 2008).

Closely related to understanding the physical health status of youth is the health literacy of those navigating health systems, as individuals are asked increasingly to play a critical role in managing their physical health needs (Manganello, 2008). Health literacy is the ability to obtain, process, and understand basic health information and services needed to make sound decisions regarding health (U.S. Department of Health and Human Services [US DHHS], 2000). To demonstrate adequate health literacy one must be able to listen, analyze, and make decisions across various health situations (Haun et al., 2015). This includes understanding medication instructions, providing consent, and being an active

participant during health visits. Limited health literacy is tied to a decreased ability for self-care, avoidable hospital stays, poor health outcomes, medication mismanagement, higher mortality rates, more frequent emergency room visits, and increased medical costs (Baker et al., 2002; Beauchamp et al., 2015; Haun et al., 2015; Peterson et al., 2011; Riegel et al., 2009; von Wagner, Knight, Steptoe, & Wardle, 2007).

Youth with disabilities are at increased risk for poor health literacy due to elevated risk in areas such as academics, behavior, family stability, and co-occurring physical health challenges. In addition to previously mentioned academic outcomes, youth with school-identified disabilities such as LD and ED experience greater rates of depression, anxiety, bullying, and isolation that may further exacerbate health risk and overall well-being (Kinne, Patrick, & Doyle, 2004; Lepore & Kliever, 2013). This likely contributes to frequent visits to health care providers and more follow-up examinations. Thomas and Atkinson (2011) reported that individuals with LD experience a greater burden of health care needs than the general population. For example, the prevalence of epilepsy for those with LD ranges between 15% and 25% compared with 1% in the general population (Deb, 2000). A relationship between stress and weaker immune functioning, as well as an association between asthma and emotion, stress, or other psychological factors which are likely to affect individuals with LD or ED, is also recognized (Connor, Doerfler, Toscano, Volungis, & Steingard, 2004; Nelson et al., 2011; Segerstrom & Miller, 2004).

One way to improve the proficiency of monitoring health-related issues and navigating the health system is to develop interventions targeting these objectives. Establishing effective health programs in schools can be a cost-effective method towards the improvement of education and health (AASH, 2016; World Health Organization [WHO], 2016). Health programs or interventions may address important health risks among youth and engage the education sector in efforts to change the educational, social, economic, and political conditions that affect risk while simultaneously improving health literacy (WHO, 2016). Despite proposed legislation such as the Healthy Schools Act (2010) and interventions to address targeted health-related issues (primarily obesity), relatively little is known about outcomes from these interventions on these actions. In fact, little is known about the number of programs or interventions that address the health outcomes/literacy in the general population, let alone programs targeting at-risk populations such as those with LD or ED. This fact is concerning, given the poor post secondary outcomes (health, family, behavioral, mental health) of individuals with LD and ED. Although it might be expected that intervention targeting health literacy would lead to improvements in outcomes which include improved physical health, to date, an exhaustive review of the literature has not been conducted. To address these gaps, this study examined the literature to address the following three questions:

- 1) What is the physical health status of school-aged students with LD and ED?
- 2) What knowledge do students with LD and ED have regarding health, health management, and wellness?
- 3) What school-related interventions, programs, or services exist to promote the health literacy of school-aged youth with LD and ED?

Methods

This review consisted of two phases. Phase one included an electronic database search, initial eligibility screening of articles, a secondary document search (e.g., ancestor search), and final eligibility determination of all identified articles. Phase two focused on the coding of multiple variables from each article.

Phase One

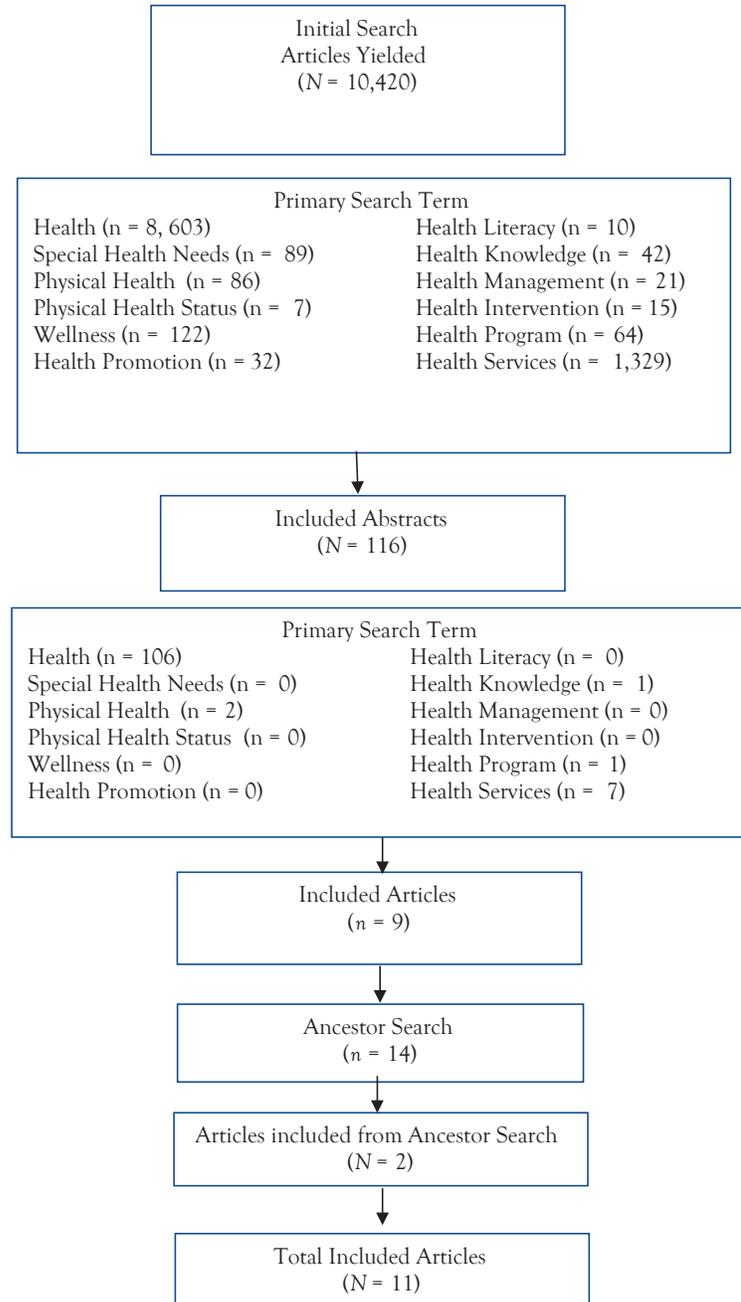
Initial search strategies. The first search method included an electronic database search of PsycINFO and MedLine. The following were used as primary search terms: *health, special health needs, physical health, physical health status, health literacy, health knowledge, health management, health intervention, health program, wellness, and services*. The secondary search term included one of the following: *students with disabilities, special education, emotional and behavioral disorders, learning disabilities, ADHD, other health impairment, conduct disorder, disruptive behavior disorder, anxiety disorder, depressive disorder, anxiety disorder, at-risk youth, high incidence disability, oppositional defiant disorder, attention deficit disorder, ED, EBD, behavior disorder, emotional disturbance, emotional disorder*. Double quotes were used around all search terms, and the * is a “wild-card” term that was used to search for suffixes (i.e., al, s) when appropriate (e.g., *disabilit**). Search parameters were also set to the following (a) published in a peer-reviewed journal from 1994-2014, (b) included a school-age and/or secondary age population, (c) written in English, and (d) excluded dissertations.

The initial electronic database search resulted in 10,420 articles. Next, two researchers read the title and abstract of each article for further inclusion, using the following initial eligibility criteria: (a) included a high incidence disability population [LD, ED], (b) identified a health-related outcome (e.g., sleep, weight, literacy) or intervention, (c) included a sample of students ages 5-21, and (d) included a recruited population from a school-based setting. After reviewing several titles and abstracts it was determined that an additional inclusion criterion was needed, given the number of articles that included a school-based population who were identified as eligible for special education for either LD or ED, but also had a clinical diagnosis of Attention-Deficit/Hyperactivity Disorder (ADHD). Therefore, a Diagnostic Statistical Manual of Mental Disorders (DSM) diagnosis of ADHD along with an IDEA verification for LD or ED were

eligible, although many of the articles did not specify whether the participants were eligible under LD or ED, but rather globally that they were eligible for IDEA services. Furthermore, some articles also used a DSM diagnosis of learning disorder and thus, it was determined that including this would also be necessary so long as the sample was recruited from a school-based setting. Inter-

rater reliability was established among raters for title and abstract inclusion until a criterion of 80% reliability was met. Inter-rater reliability agreements were calculated for 20% of the abstracts and titles and averaged 93% (see below for details on reliability agreement procedures). This initial eligibility screen resulted in 116 articles meeting the criteria for further review (see Figure 1).

Figure 1.
Flow diagram of articles included in review



Phase Two

The next step was to code the articles that met the full-inclusion criteria for the review. Two researchers independently read each article to determine if it satisfied the full-inclusion criteria. After applying these full-inclusion criteria, nine of the original 116 articles remained.

To be certain that all possible articles were included in the review, the reference sections for the nine articles included after final coding were reviewed for additional relevant publications. For all articles that were located through this ancestor search, reference sections were also checked for any additional articles that appeared to meet the established criteria. These secondary search strategies resulted in the identification of 14 potential articles, of which two met the final inclusion criteria, resulting in a total of 11 articles included in the review. The 119 articles that did not meet the inclusion criteria were excluded for the following reasons: age or grade exceeded parameters (30.2%), no health outcomes were reported (20.2%), not an original empirical study (e.g., commentary, meta-analysis, case study; 26.1%), unclear if participants were receiving IDEA services (17.6%), and other (5.9%).

Coding approach. All articles were coded using a systematic set of procedures (Duppong Hurley, Huscroft-D'Angelo, Trout, Griffith, & Epstein, 2014). A total of

21 variables were coded for each article. Six variables provided information about the article (e.g., author, year of publication, journal, etc.), nine variables were related to the study population, three variables were related to the methods portion of the study, and three variables were used for the study's result. Coding was documented on hard copies and then entered into MS Excel (Microsoft, 2010) for data cleaning, inspection, and analyses.

Reliability. Nine (82%) of the articles were double coded and assessed for inter-rater agreement. Inter-rater agreement required two reviewers to independently read and code the articles. The decisions were then compared for each variable on the coding sheet and disagreements were discussed. In the event of an inconsistency, a third reviewer read and coded the article (Duppong Hurley et al., 2014). Inter-rater agreement was 89% across the nine articles.

Results

This review of the literature resulted in the identification of 11 articles containing one study each that examined one of the three research questions. Findings associated with each research question are presented below. Eight articles focused on physical health status, two on health literacy, and one on a health literacy intervention. Table 1 displays results from each article.

Status, Literacy, Interventions Review

Table 1

Included Study Characteristics

Author(s) & Year	Topic Area ^a	Sample Size	Age	Gender	Race and Ethnicity	IDEA or DSM-IV Verification ^{b,c}	Health Outcome	Design/Objective	Summary ^d
Ameri, E., Dehkhoda, M., & Hemayatablab, R. (2012)	PHS	N = 54	Range: 8-12	-	N/A	ADHD	- Calcium levels - Bone mineral density - Physical activity	RCT- 9 month intervention aimed at improving the bone mineral density of children with ADHD	Sample was divided into four groups, no significant differences were present between level of physical activity, calcium levels, or bone mineral density
Beyer, R. (1999)	PHS	N = 112	Range: 8-12	Male-100%	N/A	LD (50%); ADHD (50%)	- Motor proficiency	Descriptive - Compare the motor proficiency of males with ADHD to those with LD	Males with ADHD had significantly poorer motor proficiency performance on five of the motor tasks (bilateral coordination, strength, visual-motor coordination, upper limb speed & dexterity) than males with LD
Chiang, P., Huang, L., Lo, Y., Lee, M., & Wahlqvist, M. (2013)	PHS	N = 2,283	Range: 6-13	-	N/A	ED (14.2%)	- Obesity	Descriptive - Secondary data analysis of national health survey to examine differences in obesity between individuals with and without symptoms of ED	Obesity prevalence was higher among individuals with symptoms ED than those without. Obesity was significantly correlated with symptoms of ED based on the SAED total and subscale scores.
Dryden, E., Desmarais, J., & Arsenault, L. (2014)	I	N = 114	Range: 13-21	Male-58%	Black, non-Hispanic (44%) Hispanic/Latino (28%) White (17.5%) Other (10.5%)	LD (1.8%)	- Advocacy skills related to physical health	Quasi-experimental- Examine the effects of the IMPACT intervention on the advocacy, self-efficacy, safety, and confidence of students with disabilities to those in a wait-list group	Significant positive findings were found for individuals in the IMPACT intervention in areas of self-advocacy knowledge, safety, confidence to defend self, and self-efficacy compared to the control group

Table 1 (continued)

Author(s) & Year	Topic Area ^a	Sample Size	Age	Gender	Race and Ethnicity	IDEA or DSM-IV Verification ^{b,c}	Health Outcome	Design/Objective	Summary ^d
Gruber, R., Sadeh, A., & Raviv, A. (2000)	PHS	N = 103	Range: 6-14	Male-100%	N/A	ADHD (37%)	-Sleep problems	sleep wake system and patterns of individuals with and without ADHD	sleep duration, and true sleep than those without ADHD but the groups did not differ significantly in their means
Huscroft-D'Angelo, J., Trout, A., Epstein, M., & Thompson, R. (2014)	HL	N = 61	M = 16.98 SD = 1.21	Male-72%	American Indian/Alaska Native (8.2%) Black, non-Hispanic (27.8%) Hispanic/Latino (13.1%) Multi-racial (9.2%) White (40.9%)	LD (34.5%); ED (19%); OHI (29%)	- General health literacy	Descriptive - investigate the health literacy status of youth receiving special education services in a residential treatment setting	
Hwang, J., Davies, P., Taylor, M., & Gavin, W. (2002)	PHS	N = 64	M = 9.48 SD = 2.14	Male-83%	Black/non-Hispanic (39%) Hispanic (9%) White (52%) Asian (5%) Black, non-Hispanic (67%) Hispanic/Latino (6%)	LD (28%)	- Physical Fitness	Descriptive - Validate an assessment examining the spectrum of school related functional skills in elementary students. To examine differences in the physical task performance of those with and without LD	There were no significant differences on assessments of physical tasks or performance between those with LD and those without
Mandell, D., Eleey, C., Cederbaum, J., Noll, E., Hutchinson, M., Jemmott, L., & Blank, M. (2008)	PHS	N = 43, 219	Range: 12-17	Male-66.5%	White (13.9%) Other (8%)	ED (2.1%); LD (10.7%)	- Illness/disease	Descriptive - Investigate the relative risk of sexually transmitted infectious disease among a special education population	Individuals classified as ED and no disability were found to have the least risk for STI; Males with LD were at an increased risk for STI diagnosis
Marcotte, A., Thacher, P., Butters, M., Borz, J., Acebo, C., & Carskador, M. (1998)	PHS	N = 165	Range:	Male-62%	N/A	ADHD (26%) LD (6.7%) ADHD/LD (15.1%)	- Sleep problems	Descriptive - Examine sleep related issues between individuals with ADHD, LD, ADHD/LD and comparison group	Individuals with ADHD and/or LD were more likely to report sleep related problems than the comparison group. This included sleep/breathing patterns and sleepiness
Singh, A., Zemitzsch, A., Ellis, C., Best, A., Singh, N. (1994)	HL	N = 220	M= 13.9 SD = 2.1	Male -55%	Black, non-Hispanic (49%) White (51%)	ED (100%)	- Knowledge and Attitudes about AIDS	Descriptive - Examine the knowledge and attitudes of students with serious emotional disturbance on the topic of HIV and AIDS; explore differences between a hospital and school based sample	A majority of the sample knew the main modes of HIV transmission, but had major misconceptions about HIV transmission. Gender and ethnicity differences were found with African American females having significantly lower knowledge of transmission
Stein, D., Pat-Horenczyk, R., Blank, S., Dagan, Y., Barak, Y., Gumpel, T. (2002)	PHS	N = 144	Range: 13-16	Male-100%	European descent (46%) Middle Eastern descent (54%)	ADHD (47%)	- Sleep problems	Descriptive - Examine sleep disturbance between individuals with ADHD taking medication to those with ADHD not taking medication and a control group	A significant difference was found between the three groups with the medicated ADHD group having the most severe sleep disturbance

Note. ^a PHS (Physical Health Status), HL (Health Literacy) ^c I (Health Related Intervention). ^b LD- Learning Disability, ED - Emotional Disturbance, ADHD- Attention Deficit Hyperactivity Disorder. ^c percentages are representative of the sample verified with diagnosis or eligibility category. ^d Summary- when appropriate information was only recorded from pretest data

Physical Health Status

Across the eight articles, sample sizes ranged from 54 to 43,219. However, data specific to those disability categories were extrapolated for this study. In the six articles (75%) that reported gender, students were predominantly male. The majority (88%) reported only participants' age range, and across all articles students ranged from ages 6-17. Race and ethnicity data were available for three (36%) of the articles. Three articles focused on youth with ADHD and IDEA verification of LD or ED, one article focused solely on ED, and one on LD. Three articles included multiple samples. Two focused on two of the disability categories and one focused on all three disability categories.

Physical health outcomes varied across articles. Three focused on sleep problems, three on physical activity or related topics (e.g., motor proficiency), one article focused on obesity, and one article targeted illness/disease. Mixed findings were reported across these studies. That is, six articles reported that youth with identified disabilities were at significantly greater risk for poor physical health outcomes. However, two articles found no difference in health outcomes between groups with and without disabilities, and one indicated mixed results, as one of the populations demonstrated elevated risk for poorer health outcomes whereas the others did not.

Health Literacy

Two articles examined health literacy in individuals with disabilities. Each study reported gender and ethnicity data with sample sizes of 61 and 220. One article focused on a specific area of health-related literacy (i.e., knowledge of HIV/AIDS), whereas the other study included global measure(s) of health literacy. Findings from these studies indicated low levels of health literacy in general, as well as with regard to knowledge of HIV/AIDS.

Health Literacy Interventions

With respect to interventions, programs, or services that promote health literacy in high-incidence populations, only one article met inclusion criteria. This article reported results of an intervention that incorporated an aspect of health literacy into the intervention and outcomes. IMPACT:Ability (Dryden, Desmarais, & Arseneault, 2014) was designed as a 10-session safety and self-advocacy training program for students with cognitive and/or physical disabilities. IMPACT:Ability focuses on increasing participants' knowledge, confidence, and skills to communicate assertively, to protect, and to advocate for themselves in settings which includes health-related settings. Specifically, the program was evaluated using a quasi-experimental design to determine differences between treatment ($n = 21$) and control ($n = 36$) conditions. The sample consisted of a small percentage of individuals identified as LD; however, significant findings were reported for the treatment group, as indicated by increased scores on measures of self-advocacy knowledge, safety, confidence to defend self, and self-efficacy for some

health-related topics, indicating improvement in areas of health literacy.

Discussion

National health agendas such as Healthy People 2020 (US DHHS, 2010) and core beliefs of school-based health organizations (AASH, 2016) continue to emphasize the importance of addressing physical health and literacy in all students, including vulnerable populations. As such, a clear understanding of the physical health status, health literacy, and available health interventions for students with LD or ED in school-based settings is critical for the development of effective educational supports and long-term transition planning. Children and adolescents with LD or ED are particularly vulnerable as they present with well-documented risk factors that impact long-term health well-being. Using a systematic process, this review sought to better understand the health status and literacy of this vulnerable subsample of youth and to identify existing school-implemented health-related interventions to promote youth health literacy in school settings.

One key finding from this review was that very little research exists regarding the physical health status, health literacy, or school-based health-related interventions in populations of youth with LD or ED. That is, our systematic and broad review of the literature yielded only 11 studies published over the past 20 years that examined at least one of the aforementioned outcomes. Moreover, although most of the scant 11 studies that were identified focused on physical health status, not enough studies exist to draw definitive conclusions. Given the risks (e.g., academic, behavioral, familial) inherent with populations of students with LD or ED (Bradley et al., 2008; Deschler, 2014; Mayer et al., 2005) and their less-than-optimal health outcomes (Blackorby et al., 2002; Wagner et al., 2003; Wagner et al., 2006), it is concerning that such little information is available regarding the physical health and health literacy status of this population in school-based settings.

Despite the paucity of existing research, there are some very tentative conclusions that can be made regarding the physical health status, health literacy, and health-related interventions for youth with school-identified disabilities. With respect to physical health status, the included studies demonstrated youth with LD or ED are at greater risk of poorer health outcomes, regardless of the health outcome examined (e.g., sleep, obesity, physical activity, etc.). This is aligned with findings from larger longitudinal studies that indicate students with disabilities in general are more likely to have poorer overall health (Blackorby et al., 2002; Chen, Kim, Houtrow, & Newacheck, 2010; Reuben & Pastor, 2013; Wagner et al., 2003). Unfortunately, results of this review do not allow for any conclusions regarding youths' physical health status as a function of other variables of interest, such as demographic characteristics. This is due in part to the low number of studies, but also to the fact that many articles lacked specific sample details on the samples included (e.g., race or ethnicity, socioeconomic background).

The second and third purposes of this literature review were to understand the health literacy and available health-related interventions for youth with LD or ED in school settings. When examining the health literacy status of this population, it is very difficult to make even preliminary conclusions, given that only two studies were identified. Similarly, there was only a single article that examined the outcomes of a health literacy intervention. Although this study reported significant improvement in health-related self-advocacy, there is little that can be generalized from this information. To establish health-literate populations in high-risk groups, there must be direct, targeted interventions which specifically address topics (Huscroft-D'Angelo et al., 2014; Trout et al., 2014). Although relatively little attention has been directed towards better understanding the physical health status and literacy of this vulnerable population, school-based settings present an optimal opportunity to intervene and contribute to improving these outcomes.

Limitations

The search and coding procedures used in this review reveal potential limitations that may have affected the results. While specific criteria were used to locate articles from the electronic databases to allow for replication of the findings, it is possible that some articles were unintentionally left out. Second, while the goal was to focus on studies using a school-based sample, other studies with youth in alternative settings (clinic, home, out-of-home care) were excluded. Although we intended to focus specifically on these two IDEA disability categories, it was quickly discovered that the terminology used to describe samples was inconsistent, and when including studies from other countries, eligibility criteria may be different than those delineated by IDEA. It is likely that other studies included comparable samples but used a clinical diagnosis or parent report of disability status. Third, it is possible that interventions or curriculums targeting specific types of health literacy (i.e., mental health literacy, substance use, dental health) exist and were not captured in this review as they did not meet our inclusion criteria. Future research should be conducted examining the various types of interventions or curriculums that target specific topics within the broader definition of health literacy. Finally, replication of this review with more broadly defined search parameters around the term *disability* may yield more studies and, as a result, the ability to draw different conclusions about the physical health status, literacy, and interventions for individuals with disabilities.

Conclusion

In sum, youth with LD and ED are likely at risk for poor health outcomes and low health literacy due to a combination of risk factors. This review examined these areas as well as interventions that aim to improve the health literacy and overall health outcomes for specific school disability categories. Unfortunately, there is little information available to determine which health

conditions are most prevalent, to what degree youth with LD and ED understand health-related information, and which programs are available to improve these outcomes. Functional health literacy helps to prepare individuals for life challenges such as college, careers, and families, indicating a need for well-designed health education in schools accessible for all students. These programs can serve as a preventative and less costly approach to promote healthy youth and prevent future health problems (ASHA, 2016). Thus, there is a need to develop programs and conduct empirical research to gather more comprehensive knowledge on the relationship between health literacy and short- and long-term outcomes in students with LD or ED. Ultimately, youth with disabilities need access to programs that will maximize their health literacy and promote proficiency in navigating health systems to lead healthy and productive lives.

Implications

Findings from this review have implications for key stakeholders, including school health professionals, education professionals, educational researchers, and medical researchers. First and foremost, there is a need for conducting empirically based studies on physical health status and health literacy within school-based samples due to inherent risks associated with subgroups such as those with LD and ED. To address national health-related agendas and develop appropriate interventions for improving these outcomes, it is important to understand fully what issues are prevalent and how they relate to school-based outcomes. National longitudinal studies which include health- and/or school-related outcomes should consider incorporating a variable for school-identified disabilities aligned to IDEA as well as incorporating several health-status related questions.

Second, although very few school-based studies were represented in this review, findings are consistent with studies demonstrating that individuals with LD and ED are at increased risk for poor health outcomes and low health literacy (Blackorby et al., 2003; Chen et al., 2010; Reuben & Pastor, 2013; Wagner et al., 2003). Thus, youth with LD and ED will likely require additional supports while in school. Further, special education teachers, school health professionals, and other educational staff should receive specialized training on certain medical conditions, including symptoms, treatment, and monitoring.

Third, understanding the difference in physical health status and literacy, based on demographic variables such as gender, is essential for moving the field forward. For example, results from previous studies show that females in high-risk populations (such as those with ED or other disabilities) are at increased risk for pregnancy, substance abuse, and poor mental health outcomes. Therefore, understanding the overall physical health status, including increased risk for certain medical conditions, is important. Likewise, it is imperative that female youth have proficient health literacy as they are more likely to navigate health systems due to their

increased risks (Shandra, 2011; Shandra & Chowdhury, 2012; Shearer et al., 2002).

Fourth, if youth with LD or ED demonstrate more risk for certain health issues, then that higher risk likely factors into the amount of time they spend out of class and could negatively influence achievement in academic areas. None of the included articles investigated how a student health status was related to important school outcomes, such as academic achievement, attendance, or behavioral functioning. Future studies need to explore these health-related issues as well as how they affect school-related outcomes, including achievement.

Finally, if other studies have reported that similar at-risk populations have increased health risks and low health literacy, developing interventions that can be implemented in schools is important. Promoting positive physical health and functional health literacy will continue to be necessary to help youth access health-related information in a meaningful way, improving the likelihood they are able to navigate health services adequately and minimize risk for poor health outcomes. Additionally, interventions must take into account needs of the population. Interventions should be written or developed in a way that youth with disabilities can access and generalize to health settings. The scientific vocabulary and readability level of content must be considered as well as the presentation of materials, such as including visual representations of the content.

References

- Arab Ameri, E., Dehkhoda, M. R., & Hemayattalab, R. (2012). Bone mineral density changes after physical training and calcium intake in students with attention deficit and hyper activity disorders. *Research in Developmental Disabilities, 33*, 594-599. doi:10.1016/j.ridd.2011.10.017
- American Association of School Health. (2016). *Advocacy: Priority areas and core beliefs in action*. Retrieved from <http://www.ashaweb.org/news-events/advocacy>
- Baker, D. W., Gazmararian, J. A., Williams, M. V., Scott, T., Parker, R. M., Green D. C. . . . Peel, J. (2002). Functional health literacy and the risk of hospital admission among Medicare managed care enrollees. *American Journal of Public Health, 92*, 1278-1283. doi:10.2105/AJPH.92.8.1278
- Beauchamp, A., Buchbinder, R., Dodson, S., Batterham, R. W., Elsworth, G. R., McPhee, C., . . . Osborne, R. H. (2015). Distribution of health literacy strengths and weaknesses across socio-demographic groups: A cross-sectional survey using the Health Literacy Questionnaire (HLQ). *BMC Public Health, 15*, 678. doi:10.1186/s12889-015-2056-z
- Beyer, R. (1999). Motor proficiency of boys with attention deficit hyperactivity disorder and boys with learning disabilities. *Adapted Physical Activity Quarterly, 16*(4), 403-414.
- Blackorby, J., Wagner, M., Cadwallader, T., Cameto, R., Levine, P., & Marder, C., (with Giacalone, P.). (2002). *Behind the label: The functional implications of disability*. Menlo Park, CA: SRI International. Retrieved from http://www.seels.net/designdocs/SEELS_FunctionalSkills.PDF
- Bradley, R., Doolittle, J., & Bartolotta, R. (2008). Building on the data and adding to the discussion: The experiences and outcomes of students with emotional disturbance. *Journal of Behavioral Education, 17*, 4-23.
- Centers for Disease Control and Prevention. (2016). *Adolescent and school health*. Retrieved from <http://www.cdc.gov/HealthyYouth/index.htm>
- Chen, A. Y., Kim, S. E., Houtrow, A. J., & Newacheck, P. W. (2010). Prevalence of obesity among children with chronic conditions. *Obesity (Silver Spring), 18*, 210-213. doi:10.1038/oby.2009.185
- Chiang, P., Huang, L., Lo, Y., Lee, M., & Wahlqvist, M. L. (2013). Bidirectionality and gender differences in emotional disturbance associations with obesity among Taiwanese schoolchildren. *Research in Developmental Disabilities, 34*, 3504-3516. doi:10.1016/j.ridd.2013.06.023
- Connor, D. F., Doerfler, L. A., Toscano, P. F., Jr., Volungis, A. M., & Steingard, R. J. (2004). Characteristics of children and adolescents admitted to a residential treatment center. *Journal of Child and Family Studies, 13*, 497-510.
- Cook, B. G., Li, D., & Heinrich, K. M. (2015). Obesity, physical activity, and sedentary behavior of youth with learning disabilities and ADHD. *Journal of Learning Disabilities, 48*, 563-576. doi:10.1177/0022219413518582
- Deb, S. (2000). Epidemiology and treatment of epilepsy in patients who are mentally retarded. *CNS Drugs, 13*, 117-128.
- Deschler, D. (2014). *The state of learning disabilities: Facts, trends and emerging issues* (3rd ed.). New York, NY: National Center for Learning Disabilities.
- Dryden, E. M., Desmarais, J., & Arsenault, L. (2014). Effectiveness of the IMPACT:Ability program to improve safety and self-advocacy skills in high school students with disabilities. *Journal of School Health, 84*, 793-801.
- Duppong Hurley, K., Huscroft-D'Angelo, J., Trout, A., Griffith, A., & Epstein, M. (2014). Assessing parenting skills and attitudes: A review of the psychometrics of parenting measures. *Journal of Child and Family Studies, 23*, 812-823. doi:10.1007/s10826-013-9733-2
- Gruber, R., Sadeh, A., & Raviv, A. (2000). Instability of sleep patterns in children with attention-deficit/hyperactivity disorder. *Journal of the American Academy of Adolescent Psychiatry, 39*, 495-501. doi:10.1097/00004583-200004000-00019
- Haun, J. N., Patel, N. R., French, D. D., Campbell, R. R., Bradham, D. D., & Lapcevic, W. A. (2015). Association between health literacy and medical care costs in an integrated healthcare system: A regional population based study. *BMC Health Services Research, 15*, 249. doi:10.1186/s12913-015-0887-z
- Healthy Schools Act of 2010, D.C. Law 18-209, D.C. Code § 38-821.01 et seq. (2010).

- Huscroft-D'Angelo, J., Trout, A. L., Epstein, M. H., & Thompson, R. (2014). The health literacy status of youth with disabilities in a residential treatment setting. *Social Welfare: Interdisciplinary Approach*, 4, 109-118.
- Hwang, J., Davies, P. L., Taylor, M. P., & Gavin, W. J. (2002). Validation of school function assessment with elementary school children. *OTJR: Occupation, Participation and Health*, 22(2), 48-58. doi:10.1177/153944920202200202
- Kinne, S. T., Patrick, D. L., & Doyle, D. L. (2004). Prevalence of secondary conditions among people with disabilities. *American Journal Public Health*, 94, 443-445.
- Lee, B. R. (2008). Defining residential treatment. *Journal of Child and Family Studies*, 17, 689-692.
- Lepore, S. J., & Kliewer, W. (2013). Violence exposure, sleep disturbance, and poor academic performance in middle school. *Journal of Abnormal Child Psychology*, 41(8), 1179-1189. doi:10.1007/s10802-013-9709-0
- Mandell, D. S., Eeley, C. C., Cederbaum, J. A., Noll, E., Hutchinson, M. K., Jemmott, L. S., & Blank, M. B. (2008). Sexually transmitted infection among adolescents receiving special education services. *The Journal of School Health*, 78(7), 382-388.
- Manganello, J. A. (2008). Health literacy and adolescents: A framework and agenda for future research. *Health Education Research*, 23(5), 840-847.
- Marcotte, A. C., Thacher, P. V., Butters, M., Bortz, J., Acebo, C., & Carskador, M. A. (1998). Parental report of sleep problems in children with attentional and learning disorders. *Journal of Developmental and Behavioral Pediatrics*, 19(3), 178-186. doi:1097/00004703-199806000-00005
- Mayer, M., Lochman, J., & Van Acker, R. (2005). Introduction to the special issue: Cognitive-behavioral interventions with students with EBD. *Behavioral Disorders*, 30, 197-212.
- Nelson, T. D., Smith, T. R., Thompson, R. W., Epstein, M. H., Griffith, A. K., Duppong-Hurley, K. D., & Tonniges, T. F. (2011). Prevalence of physical health problems among youth entering residential treatment. *Pediatrics*, 128(5)e1226-1232. doi:10.1542/peds.2010-3609
- Peterson, P. N., Shetterly, S. M., Clarke, C. L., Bekelman, D. B., Chan, P. S., Allen, L. A., . . . Masoudi, F. A. (2011). Health literacy and outcomes among patients with heart failure. *Journal of the American Medical Association*, 305(16), 1695-1701. doi:10.1001/jama.2011.512
- Reuben, C., & Pastor, P. (2013). The effect of special health care needs and health status on school functioning. *Disability and Health Journal*, 6, 325-332. doi:10.1016/j.dhjo.2013.03.003
- Riegel, B., Moser, D., Anker, S., Appel, L. J., Dunbar, S. B., Grady, K. L., . . . American Heart Association Interdisciplinary Council on Quality of Care and Outcomes Research. (2009). State of the science: promoting self-care in persons with heart failure: A scientific statement from the American Heart Association. *Circulation*, 120(12), 1141-1163. doi:10.1161/CIRCULATIONAHA.109.192628
- Segerstrom, S. C., & Miller, G. E. (2004). Psychological stress and the human immune system: A meta-analytic study of 30 years of inquiry. *Psychological Bulletin*, 130(4), 601-630. doi:10.1037/0033-2909.130.4.601
- Shandra, C. L. (2011). Life-course transitions among adolescents with and without disabilities. *International Journal of Sociology*, 41, 67-86. doi:10.2753/IJS0020-7659410104
- Shandra, C. L., & Chowdhury, A. R. (2012). The first sexual experience among adolescent girls with and without disabilities. *Journal of Youth and Adolescence*, 41, 515-532. doi:10.1007/s10964-011-9668-0
- Shearer, D. L., Mulvihill, B. A., Klerman, L. V., Wallander, J. L., Hovinga, M. E., & Redden, D. T. (2002). Association of early childbearing and low cognitive ability. *Perspectives on Sexual and Reproductive Health*, 34, 236-243. doi:10.2307/3097822
- Singh, A. N., Zemitzsch, A. A., Ellis, C. R., Best, A. M., & Singh, N. N. (1994). Seriously emotionally disturbed students knowledge and attitudes about AIDS. *Journal of Emotional and Behavioral Disorders*, 2, 156-163. doi:10/1177/106342669400200303
- Stein, D., Pat-Horenczyk, R., Blank, S., Dagan, Y., Barak, Y., & Gumpel, T. P. (2002). Sleep disturbances in adolescents with symptoms of attention-deficit/hyperactivity disorder. *Journal of Learning Disabilities*, 35, 268-275. doi:10.1177/002221940203500308
- Thomas, B., & Atkinson, D. (2011). Improving health outcomes for people with learning disabilities. *Nursing Standard*, 26, 33-36. doi:10.7748/ns2011.10.26.6.33.c8757
- Trout, A. L., Casey, K., Chmelka, B., DeSalvo, C., Reid, R., & Epstein, M. H. (2009). Overlooked: Children with disabilities in residential care. *Child Welfare*, 88(2), 111-136.
- Trout, A. L., Hoffman, S., Epstein, M. H., Nelson, T. D., & Thompson, R. W. (2014). Health literacy in high-risk youth: A descriptive study of children in residential care. *Child and Youth Services*, 35(1), 1-11.
- Trout, A. L., Lambert, M. C., Nelson, T. D., Epstein, M. H., & Thompson, R. (2014). Prevalence of weight problems among youth with high-incidence disabilities in residential care. *Behavioral Disorders*, 39(3), 165-174. doi:10.1080/0145935X.2014.893744
- Trout, A. L., Lambert, M. C., Nelson, T. D., Epstein, M. H., & Thompson, R. W. (2015). Prevalence of physical health issues of youth with school identified disabilities in residential settings: A brief report. *Disability and Health Journal*, 8(1), 118-122. doi:10.1016/j.dhjo.2014.06.006
- U.S. Department of Health and Human Services. (2010). *Healthy people 2020: Understanding and improving health*. Retrieved from https://www.healthypeople.gov/sites/default/files/DefaultPressRelease_1.pdf

- U.S. Department of Health and Human Services Office of Disease Prevention and Health Promotion. (2000). *National action plan to improve health literacy*. Retrieved from <http://www.health.gov/communication/hlactionplan/>
- von Wagner, C., Knight, K., Steptoe, A., & Wardle, J. (2007). Functional health literacy and health promoting behaviour in a national sample of British adults. *Journal of Epidemiology and Community Health*, 61(12), 1086-1090. doi:10.1136/jech.2006.053967
- Wagner, M., Marder, C., Levine, P., Cameto, R., Cadwallader, T., & Blackorby, J. (with Cardoso, D. & Newman, L.). (2003). *The individual and household characteristics of youth with disabilities: A report from the National Longitudinal Transition Study-2 (NLTS2)*. Menlo Park, CA: SRI International.
- Wagner, M., Newman, L., Cameto, R., & Levine, P. (2006). *The academic achievement and functional performance of youth with disabilities: A report from the National Longitudinal Transition Study-2 (NLTS2)*. (NCSER 2006-3000). Menlo Park, CA: SRI International.
- World Health Organization. (2016). *School health and youth health promotion*. Retrieved from http://www.who.int/school_youth_health/en/
-

Authors

[Jacqueline Huscroft-D'Angelo](#), PhD, is an Assistant Research Professor at the Academy for Child and Family Well-Being at the University of Nebraska-Lincoln. Her research interests include developing and evaluating interventions for students at risk or identified with emotional and behavioral disorders and supporting youth in out-of-home care settings who are transitioning back to home and school, dropout prevention, promoting school engagement, and family support. Dr. Huscroft-D'Angelo is currently key personnel of several projects funded by the Institute for Education Sciences.

[Alexandra Trout](#), PhD, is a Research Professor and Co-Director of the Academy for Child and Family Welfare at the University of Lincoln-Nebraska. Her research interests include research-to-practice programs designed to assess the broad risks of children with emotional and behavior disorders (EBD) and their families served in the continuum of care. Her work includes the development and evaluation of educational, dropout prevention, placement stability, and health literacy interventions. Dr. Trout's current work is funded by the Department of Education Institute for Educational Sciences.

[Kristin Duppong Hurley](#), PhD, is a mental health services researcher focused on intervention development and testing for families of youth with emotional or behavioral needs. She is currently exploring the impact of Parent Connectors, a parent-to-parent support intervention for families of middle school students with an IEP for emotional or behavioral disorders. Her research interests

include exploring how to best engage parents and support their understanding and involvement in their child's special education services. Dr. Duppong Hurley is also examining how the role of parental involvement in education might operate differently for the families of students at-risk for emotional and behavioral needs.

[Stacy-Ann A. January](#), PhD, is currently an Assistant Professor at the University of South Carolina. Her research interests include developing and evaluating interventions for students with emotional/behavioral and academic difficulties.
