

An Overview of Published Medical Research About Child Abuse and Neglect During 2006-2015

Key words: Child abuse medical research; child abuse pediatrics; study design; level of evidence

Vincent J. Palusci, MD, MS, FAAP*
Jessica Perfetto, MD

Introduction

The purpose of medical research has been described as “to rid men of diseases, to protect them from maladies with which they are threatened, and to relieve them of discomforts once they are established” (Cohn, 1938, p. 265). Given that approximately 1%–2% of all children are found annually to be victims of child abuse and neglect and 1 in 3 will be reported to child protective services (CPS) before age 18, it is apparent that *child maltreatment* (CM) is a “malady” affecting large numbers of children (United States Department Health Human Services [US DHHS], 2017; Kim, Wildeman, Jonson-Reid, & Drake, 2017). Medicine has played an important part in the determination, treatment, and prevention of the physical and emotional injuries caused by child abuse and neglect since they were widely recognized by the medical community (Kempe, Silverman, Steele, Droegemueller, & Silver, 1962). The U.S. Institute of Medicine (IOM) and the National Research Council (NRC) have noted that a medical opinion is the only way to determine whether certain injuries to the head, bones, skin, anus, and genitals are the result of abuse or neglect (Petersen, Joseph, & Feit, 2014).

Published research on child abuse and neglect overall has addressed medical issues pertaining to epidemiology, clinical presentation, diagnosis, treatment, and prevention (Tran et al., 2018). Many research designs have been used, including

observational studies (e.g., case reports or other comparisons, with or without controls) that are analyzed prospectively or retrospectively without any intervention by the investigators) and experimental studies (in which the effects of an intervention are measured). Qualitative designs have been used to generate new knowledge or validate existing knowledge by using methods such as surveys or focus groups. As knowledge improves in medicine, there is generally more use of rigorous prospective, controlled, and randomized clinical trials and systematic meta-analyses, particularly for certain types of outcomes (Parfrey & Ravani, 2009). A validity hierarchy has been proposed with randomized controlled trials and meta-analyses offering the highest level of evidence, and the American Academy of Pediatrics (AAP) proposed four levels of aggregate evidence quality (A-D) for classifying evidence for the development of clinical guidelines (AAP, 2004; Sargeant, Kelton, & O’Connor, 2014). Systems have been developed to assess the level of evidence for particular injuries or issues (CORE INFO, 2017; Tanaka, Jamieson, Wathen, & MacMillan, 2010), and a system with five levels and multiple sublevels has been used internationally (Oxford Centre for Evidence-Based Medicine [OCEBM], 2009; OCEBM, 2011).

Although a number of reviews of child protection research has been published (Buckley, Corrigan, & Kerrins, 2010; Higgins, Adams, Bromfield, Richardson, Aldana, 2005; Taylor et al., 2015; Jones et al., 2017;

* Corresponding Author

Tanaka et al., 2010; Tran et al., 2018), the underlying methodologies and quality of medical research have not yet been specifically addressed. For example, the United Kingdom undertook an extensive review in 2015 to determine what research has been published and how it can be classified, in what disciplines, and using which designs and types of data. Of the 467 articles found published during 2010–2014, three quarters had first authors from the disciplines of psychology (28%), medicine (14%), social work (14%), and psychiatry (12%). In general, qualitative and nonexperimental studies predominated; however, only a small number of medical studies used a qualitative research design compared with over half of the studies from social work, law, sociology, social science, and nursing. Surveys were the next most utilized design, followed by nonexperimental evaluations and cohort studies. Very few academic papers reported the results of a randomized, controlled trial. In Canada, Tanaka et al. (2010) found 13 RCTs in a 50-year review of published interventions to reduce physical abuse and neglect recurrence. They concluded that there were too many methodological limitations in the studies to draw reliable conclusions as to the effectiveness of interventions. Levey et al. (2017) in the United States found only eight randomized controlled trials of interventions designed to prevent abuse among mothers identified as high risk. Of these, only three found statistically significant reductions in abuse by any measure, and only two found reductions in incidents reported to child protective services.

Even though medical research priorities continue to be identified, we feel it is important to evaluate the status of medical research in the field of child abuse and neglect to assist medical researchers in identifying trends and gaps in study design as well as in areas needing additional research (Lindberg et al., 2017). While *child abuse and neglect* is often characterized as “nonmedical” or “outside traditional medical research,” any such evaluation will take place in the context of medical research overall, in which there has been a perceived decline in the rigor of study design (Fletcher & Fletcher, 1979; McDermott et al., 1995). A review of 50 years of articles in the *Journal of Pediatrics*, for example, noted an increase in empirical articles, cohort surveys, and cross-sectional designs with smaller numbers of case reports and case-control

studies during 1932–1982 (Hayden & Saulsbury, 1982). Child abuse and neglect was not specifically categorized in this study, but may have been included under “behavioral pediatrics,” “general pediatrics,” or “other” categories. When repeated in 2009, there was an increase in pediatric analytic studies, some of which may have also been related to child abuse and neglect (Hellemes, Burka, & Hayden, 2009).

To better understand the strength of the evidence in medical research in child abuse and neglect, we reviewed this literature to assess the following: (1) the frequency of publication, (2) the specialties of the journals publishing this research, (3) the use of specific observational and interventional study designs and level of evidence, and (4) the existence of relationships between article characteristics and specific child maltreatment types.

Methods

Article Selection

To identify published medical research about child abuse and neglect, we searched the U.S. National Library of Medicine’s *PubMed* website (<https://www.ncbi.nlm.nih.gov/pubmed>) during March 2017. *PubMed* is a free resource developed and maintained by the National Center for Biotechnology Information (NCBI) at the National Institutes of Health (NIH), which comprises over 24 million citations for biomedical literature from MEDLINE, life science journals, and online books. The number of citations has risen annually from 634,318 in 2006 to more than 800,000 in 2015. Citations and abstracts in the fields of biomedicine and health that cover portions of the life sciences, behavioral sciences, chemical sciences, and bioengineering (with approximately 40%–45% coming from the U.S. *PubMed*) were searched for all citations during publication years 2006 through 2015 under the medical subject heading *child abuse*, which includes physical and sexual abuse and neglect. Not included in that subject heading was *shaken baby syndrome*, which was searched separately given its importance as a form of child abuse (Choudhary et al., 2018). The 10-year period 2006–2015 was chosen to allow sufficient time for complete indexing. We found 9,147 citations listed by the National Library of Medicine during this period under the major headings of *child abuse* or

shaken baby syndrome. Most publications identified by this broad search were not medical articles despite their citation in PubMed. By limiting the results to exclude letters, editorials, and nonmedical articles, that number was significantly reduced. Searches were also made for *clinical trial, cohort, case series, case report, cross-sectional, case control, and ecological articles* during the study period. To assure inclusion of reviews and consensus statements, additional searches were made using the terms *consensus, systematic review, meta-analysis, guidelines, and policy*. Additional searches were also made in the Cochrane (<http://www.cochrane.org/search/site/Child%20abuse?>) and CORE INFO (2017) databases (Higgins & Green, 2011). Animal studies, editorials, commentaries, correspondence, letters, and articles principally about mental health, child welfare, legal, or continuing medical education topics were excluded. When the articles were checked and compared with Cochrane and CORE INFO, and when duplicates and nonmedical studies were excluded, the remaining total was found to be 366.

Information collected and article characterization

Article title, journal name, publication date, and authors were recorded. Articles were characterized as *medical* if they studied the biology or pathophysiology of disease or injury, the prognosis or physical health outcomes, or both. Duplicates and articles dealing with primarily nonmedical issues were removed, and abstracts for the remaining articles were reviewed to ascertain a number of additional study characteristics. If these were not apparent from the abstract, actual articles were reviewed. Reports were classified by the level of evidence (LOE) based on study design. LOE was grouped into major levels based on OCEBM guidelines (OCEBM, 2011) in which level I evidence consisted of high-quality, randomized controlled trials that were adequately powered and the systematic reviews of such studies. Level II publications consisted of lesser-quality, randomized controlled trials; prospective cohort studies; and systematic reviews of those studies. Level III studies consisted of retrospective comparative studies and case-control studies and systematic reviews of those studies. Level IV studies were typically of the case-series variety or nonsystematic reviews of studies, and

level V articles were usually case reports, consensus, policy statements, or guidelines based on expert opinion. Qualitative studies were categorized as level III or IV depending on design. For reviews, including systematic reviews and meta-analyses, LOE was based on the quality of the underlying studies. Given that only small numbers of level II trials were found in our analysis, further categorization was not done. Journals were classified as general medicine, pediatrics, nonpediatric specialty, mental health, public health, child welfare, or legal/forensic. The primary type of maltreatment discussed was characterized as physical abuse, sexual abuse, neglect, or psychological maltreatment based on federal definitions (US DHHS, 2017). Medical child abuse and medical care neglect were coded with neglect due to small numbers, and articles with more than one type or nonspecific trauma were labelled as *multiple*.

Analysis

Frequencies of article and journal characteristics were stratified by year of publication and maltreatment type. Basic statistics were used for comparisons of the numbers and types of articles, and the level of evidence of their designs was stratified by year and the type of maltreatment. Statistical comparisons were done using chi square for categorical variables and Student t tests and ANOVA for continuous variables with posthoc comparisons across CM types as needed. Calculation of group modes, medians, means, 95% confidence intervals, and linear regression models were done using standard methods (SAS version 9.1, Cary, NC) with significance set at $p \leq 0.05$. This current study was deemed ineligible for review as human research by our institutional review committee.

Results

Among the 9,147 articles listed in PubMed during 2006–2015 under the major headings of *child abuse* or *shaken baby syndrome*, 494 remained after duplicates and nonmedical articles were removed. Of these, 138 were primarily related to mental health variables or outcomes, leaving 366 for analysis of primarily physical health studies, including historical and physical manifestations of injuries and disease. The number of articles per year ranged from 23 in 2007 to 58 in 2015 (Table 1). There was a trend for

An Overview of Published Medical Research...

Table 1. Study Designs and Child Maltreatment Types by Year Published.

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Total	32	23	36	39	44	45	24	29	36	58
CM Type										
Physical Abuse	18	10	20	19	17	18	9	13	11	23
Sexual Abuse	8	3	12	10	10	10	5	7	7	17
Neglect/MN/MCA	1	1	1		2	1		1	2	3
Multiple types/trauma	5	9	3	10	15	16	10	8	16	15
Study Design										
Case Control	2	0	1	2	5	3	1	2	1	0
Case Report/Series	17	12	19	18	13	16	6	7	4	15
Clinical Trial	2	4	1	1	4	2	1	4	3	3
Ecological	0	0	0	0	0	0	0	0	1	0
Longitudinal Cohort	0	0	2	0	0	0	0	0	0	2
Review	5	4	7	9	9	11	1	6	8	14
Cross-Sectional	6	3	6	9	13	13	15	10	19	24
Prospective, %	25%	26%	33%	28%	43%	22%	29%	21%	14%	16%

CM: Child Maltreatment; MCA: Medical Child Abuse; MN: Medical Neglect

Figure 1. Published Articles per Year, 2006–2015.

Frequency and Trendline of Published Articles in PubMed, 2006-2015

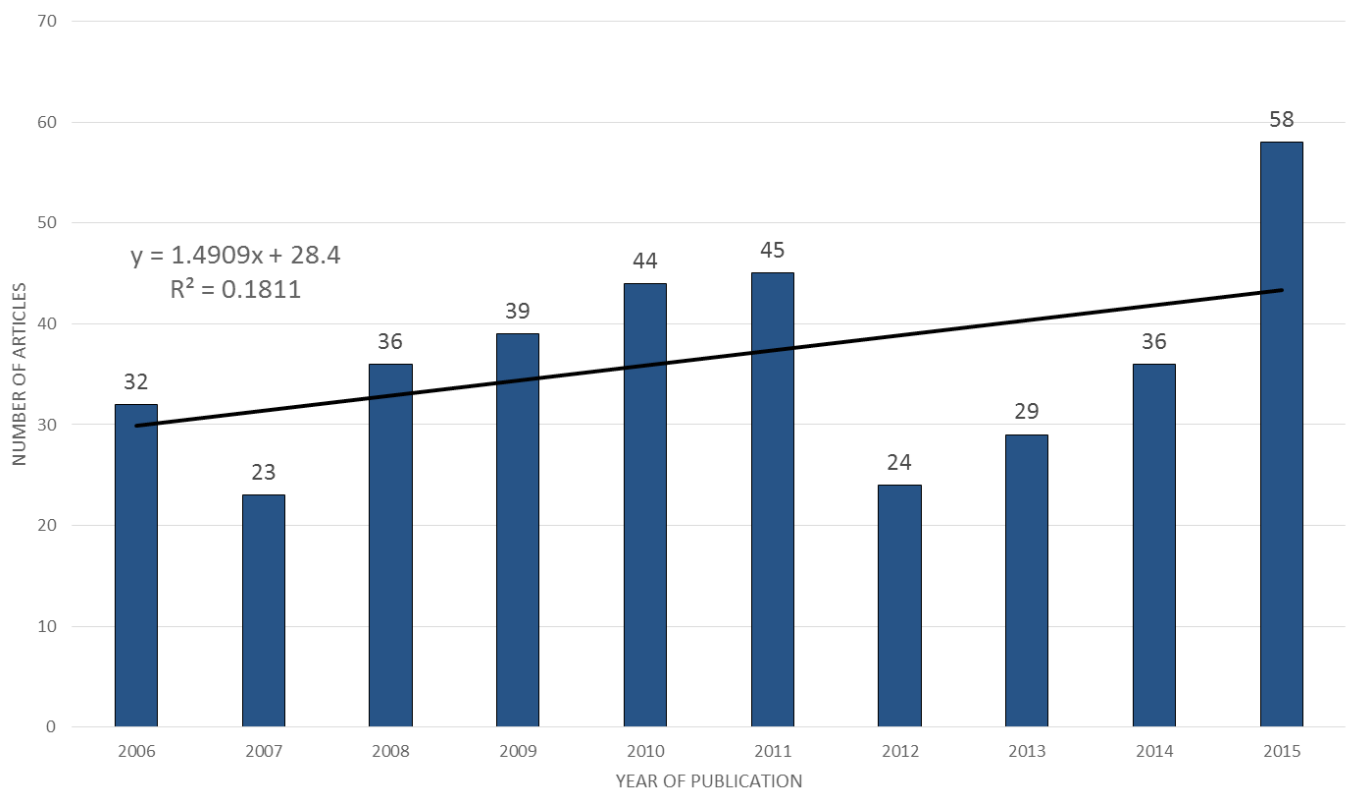


Table 2. Study Designs by Child Maltreatment Type.

	Physical Abuse	Sexual Abuse	Neglect/MN/ MCA	Multiple Types/Trauma	Totals
Total	158	89	12	107	366
Study Design					
Case Control	5	3	2	7	17
Case Report/Series	80	29	3	15	127
Clinical Trial	3	10	2	10	25
Ecological	0	0	0	1	1
Longitudinal Cohort	0	2	0	2	4
Review	33	18	2	21	74
Cross-Sectional	37	27	3	51	118
Prospective, %	16%	31%	33%	32%	25%

MCA: Medical Child Abuse; MN: Medical Neglect

Table 3. Journal Fields by Child Maltreatment Type.

	Physical Abuse	Sexual Abuse	Neglect/MN /MCA	Multiple Types/Trauma	Totals
Total=	158	89	12	107	366
Journal Field					
Child Welfare	8	17	1	15	41
Forensic	31	9	1	5	46
Medicine	12	9	2	22	45
Mental Health	0	8	1	11	20
Pediatrics	38	26	5	26	95
Public Health	5	7	1	8	21
Other Specialty (subtotal):	64	13	1	20	98
Dentistry				1	1
Dermatology	1				1
Emergency Medicine	12	2		2	16
Endocrinology		1		2	3
Neurology	2	1		4	7
Nursing		4	1	6	11
Obstetrics & Gynecology		5		3	8
Ophthalmology	15			1	16
Orthopedics	8			1	9
Otolaryngology	4				4
Physical Medicine	1				1
Radiology	18				18
Surgery	3				3

MCA: Medical Child Abuse; MN: Medical Neglect

increases at the rate of 5% more per year (Figure 1). The primary type of maltreatment was physical abuse (158), followed by multiple types (107), sexual abuse (89), and neglect (12). There were no medical articles that primarily involved psychological maltreatment. Among designs, case series or case reports predominated (127), followed by cross sectional (118), clinical trials (25), case control (17), longitudinal cohort (4), and ecological designs (1). There were also 74 reviews or commentaries, 17 of which were systematic reviews of cases, 14 of observational studies, and 3 of trials. Most (75%) were retrospective studies, and there was a trend toward fewer prospective studies in later years. Using broad topic areas, most articles (205) were related to diagnosis, followed by professional issues/training (68), epidemiology (38), outcomes (35), and treatment (20).

When categorized by CM type, the majority of articles used case series for physical abuse, followed

by cohort and case control study designs (Table 2). Most articles came from journals in nonpediatric specialties (98), followed by pediatrics (95), forensic medicine (49), general medicine (48), child welfare (41), and public health (21) (Table 3). Most of the articles (98) published in nonpediatric specialty journals were related to physical abuse. For sexual abuse, case control and cohort studies predominated, closely followed by case reports and case series. Level III studies were the majority of designs used to study multiple CM types. Consensus statements, primarily from the American Academy of Pediatrics, addressed many CM types. Trials represented fewer than 10% of all studies in all categories, and there were no controlled clinical trials found in our sample.

The mode, median, and mean levels of evidence (LOE) for all the studies were 3, 4, and 3.59, respectively. LOE differed by CM type (Figure 2) with 3.86 for physical abuse; 3.47 for sexual abuse; 3.42 for neglect,

Figure 2. Published Articles, by Level of Evidence and Child Maltreatment Type, 2006–2015.

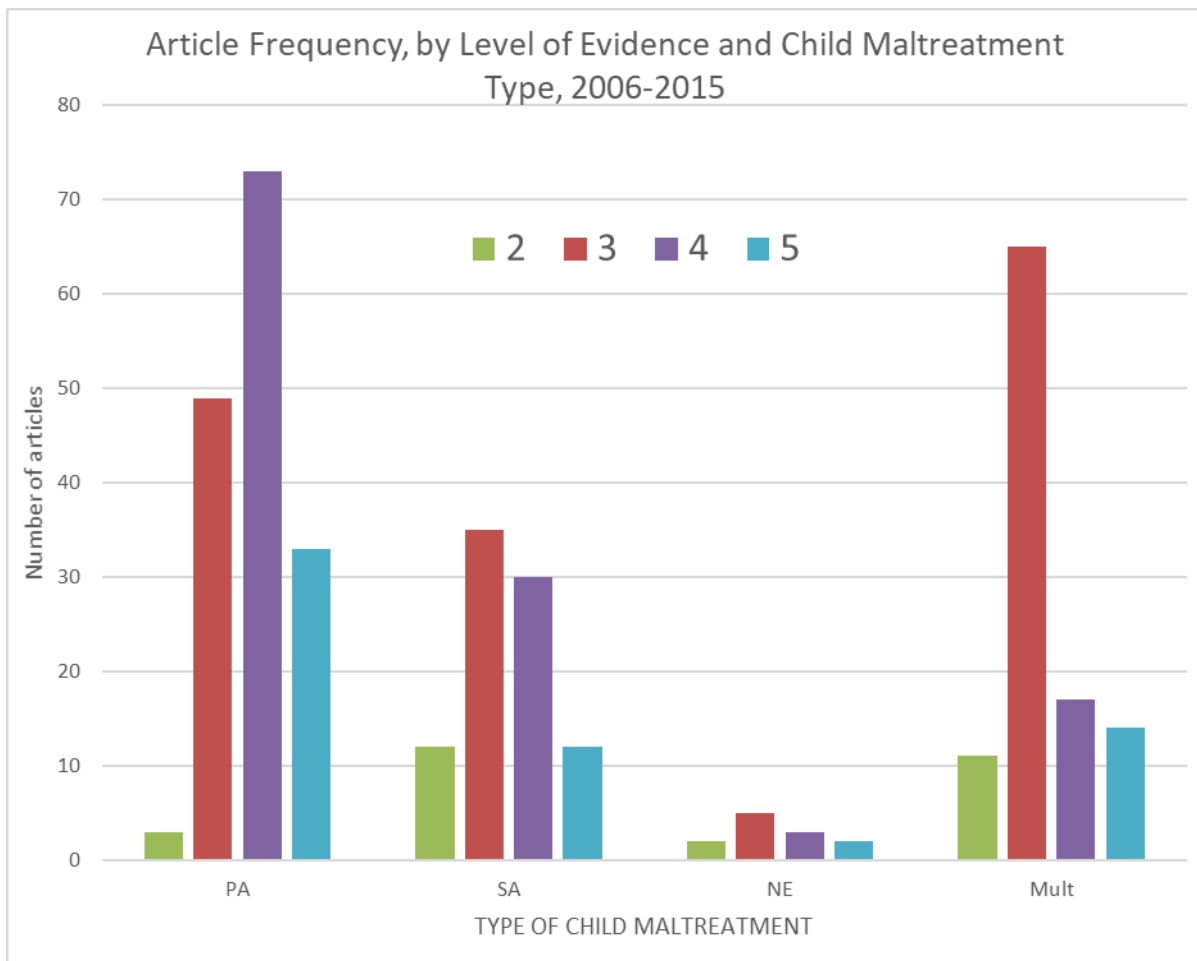
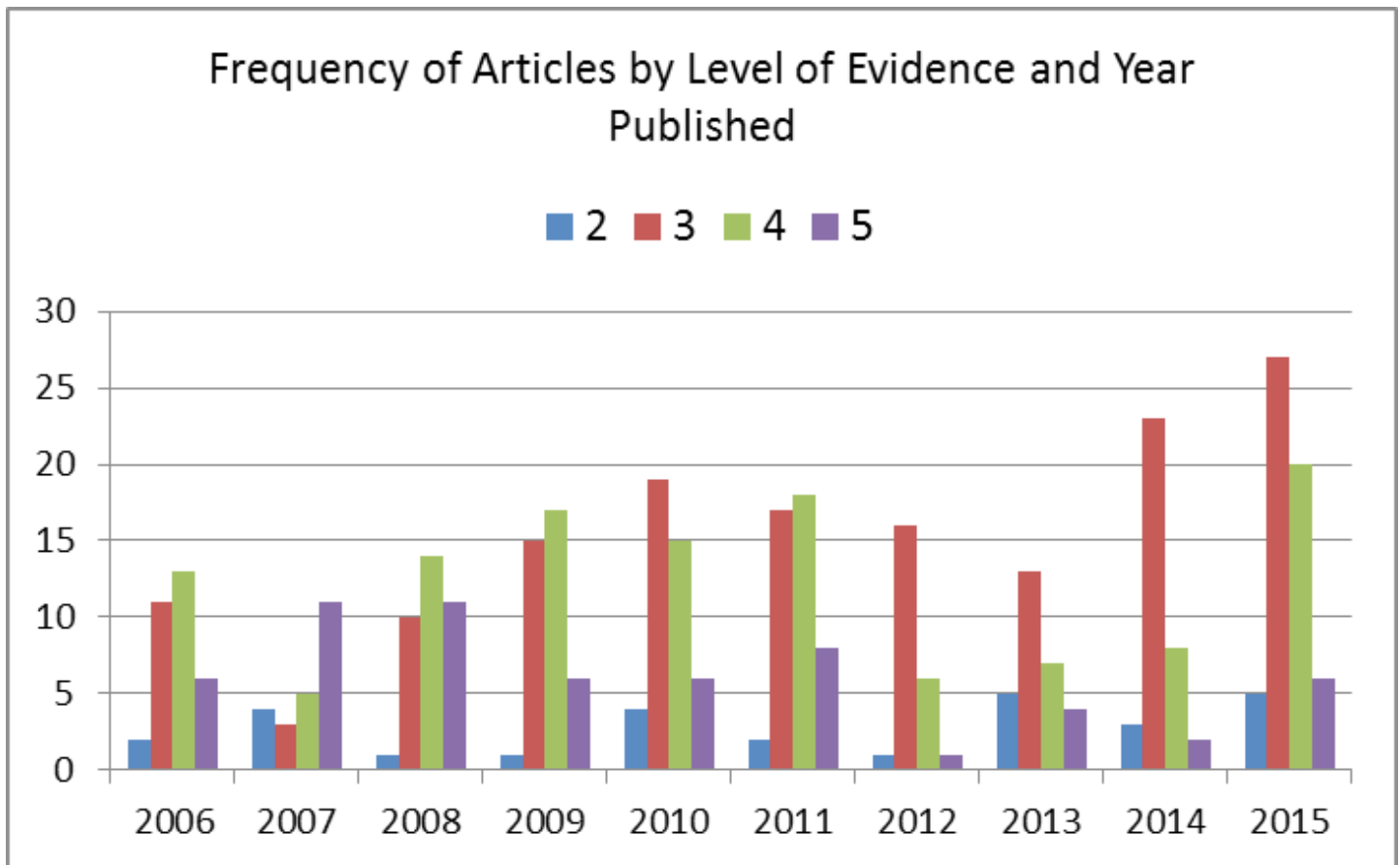


Table 4. Level of Evidence by Child Maltreatment Type.

	Physical Abuse	Sexual Abuse	Neglect/MN/MCA	Multiple Types	Totals
Total	158	89	12	107	366
Level of Evidence					
I	0	0	0	0	0
II	3	12	2	11	28
III	49	35	5	65	154
IV	73	30	3	17	123
V	33	12	2	14	61
Mode	4	3	3	3	3
Median	4	3	3	3	4
Mean	3.86	3.47	3.42	3.32	3.59
Trend Slope	-0.078	-0.006	-0.109	-0.056	-0.071
Trend r²	0.539	0.001	0.145	0.352	0.648

MCA: Medical Child Abuse; MN: Medical Neglect

Figure 3. Published Articles by Level of Evidence, by Year.



medical neglect, or medical child abuse; and 3.32 for multiple types, general trauma, or adverse childhood experiences (Table 4). Mean LOE for physical abuse articles differed significantly from sexual abuse and multiple-type articles ($p < 0.05$) but not neglect articles in post-hoc Tukey and Scheffe comparisons. The remaining pairwise comparisons were statistically not significant ($p > 0.05$). Over the ten-year period, a greater number of level II and III articles were published (Figure 3). For each of the CM types, the overall mean LOE improved (slope = -0.062 , $r^2 = 0.046$, $p < 0.0001$), with a negative slope indicating lower level of evidence numbers and thus higher quality of evidence. The greatest significant improvements were noted in studies of neglect (-0.109 , $p < 0.05$). Less but still significant improvement was seen in articles on physical abuse (-0.078 , $p < 0.05$) and multiple types (-0.056 , $p < 0.05$). Insignificant change was noted in articles about sexual abuse (-0.006 , $p > 0.05$).

Discussion

Among the 366 medical articles identified, the greatest number were related to medical diagnosis of child abuse and neglect. The overall level of evidence of 3.59 suggests that most studies or reviews of studies were of case reports and observational studies, such as case-control or cohort designs. No level I trials were identified, suggesting that the researchers did not modify treatments or outcomes using a controlled, randomized experimental design. A steady growth in the number of articles (5%) outpaced the growth of *PubMed* citations in general (2%–3%).

Scribano (2012) has noted that “as the Child Abuse Pediatrics field has ‘come of its own’ in these recent years, so has the science of the field...with new insights, emerging technology, and issues pertaining to child maltreatment (p. 153).” RCTs and meta-analysis have the potential to be the best source of evidence to inform decision making with underlying methods that have become much more sophisticated, but achieving this requires advances in the underlying science (Berlin & Golub, 2014). Additionally, there are limitations in the ethical usage of RCTs in the field of child abuse. Articles found in medical and surgical specialty journals usually pertained to specific organ systems where child maltreatment injuries occur

(e.g., Servaes et al., 2016). There were also articles in mental health and public health journals to a lesser degree. It is surprising that a recent review (Hellems et al., 2009) of articles in the *Journal of Pediatrics* did not specifically list child abuse and neglect as a topic area despite recognition of the problem in medicine (Kempe et al., 1962). With recognition of child abuse pediatrics by the American Board of Pediatrics for over ten years, the subspecialty is relatively new, and biomedical funding for child abuse medical research and training is limited (Block & Palusci, 2006; Krugman, 2016).

We noted several relationships between article characteristics and specific child maltreatment types. The level of evidence for physical abuse articles differed significantly from those regarding sexual abuse and multiple CM types. There was a dearth of published research about neglect that may reflect the relative paucity of physical injuries or conditions needing medical attention. The greatest number of published articles was for physical abuse, with the greatest proportion of these being case reports and uncontrolled studies. This may reflect that the science is less developed in this area than in sexual abuse, for example, which had a preponderance of more rigorous controlled and cohort studies. Studies of multiple types also included those looking at risk factors and biologic consequences for adverse childhood experiences, by far the greatest proportion of which were level III studies. Level II trials were found most often in this group and in sexual abuse articles. Trends over time showed the greatest improvements for neglect articles, which may reflect some degree of catch up in the level of science in this area.

While few similar studies were available for comparison, the LOE we found in child abuse medical research was not very different from that in other areas in medicine and contained a mix of different types of observational studies and a small number of trials. Small but growing numbers of articles in general medicine and pediatric journals have used clinical trials and more complex observational designs (Fletcher & Fletcher, 1979; Hayden & Saulsbury, 1982; McDermott et al., 1995; Hellems et al., 2009). Nyugen and Mahabir (2016) assigned similar level-of-evidence scores to examine the overall quality of plastic surgery

research and compared LOE grades in 2013 with those from 1983, 1993, and 2003. Their mean LOE was 3.42, and the comparison reported significant improvement in research quality over time, a decrease in the percentage of level IV and V studies, and increased higher quality level I and II studies. In a European review of the literature in otolaryngology (ENT), Rotter (2016) noted that the percentage of prospective trials in the ENT-specific literature was significantly higher than in other disciplines, including the fields of neurosurgery, ophthalmology, and orthopaedics, but most publications were classified as evidence level IV. Levels improved slightly with time, with 80% of the therapy studies classified as levels III–V and 75% of the diagnostic trials as evidence levels I and II. In a comparison of ENT with general pediatrics, a similar rate of RCTs was found in both disciplines (Shin, Rauch, Wasserman, Coblens, & Randolph, 2011).

It should be kept in mind that medical research in child abuse and neglect differs from other child abuse research overall. British studies (Taylor et al., 2015; Jones et al., 2017) noted that qualitative studies predominated in overall research in child abuse and neglect (followed by cross-sectional, nonexperimental, cohort studies, and RCTs) by a ratio of nonempirical to empirical studies of 3:1. Consequences of maltreatment in adulthood were commonly studied (21%), followed by system or practice responses (14%), attitudes and beliefs (11%), the nature of outcomes in childhood (11%), the etiology of child maltreatment (8%), and children's experiences (8%), and more research exists on sexual abuse than on physical abuse or neglect. An Australian review (Higgins et al., 2005) looked at the quality and types of studies for different issues within child abuse research (i.e., intervention programs, risk factors, etc.), and the research reviewed was largely qualitative. Quantitative research in their review was primarily nonexperimental and descriptive and tended to rely on categorical data with research objectives that tended to be exploratory rather than hypothesis-driven. There was also a heavy reliance on existing case records for data, and projects tended to be cross-sectional and retrospective. An Irish review, which discussed quality of research in terms of "external quality assurance" rather than levels of evidence, also found mostly qualitative research (Buckley et al., 2010).

Several limitations of our study may limit its usefulness and applicability. This study focused on physical health publications indexed in the medical literature and specifically excluded a number of nonmedical and mental health studies that are important for the field. We realize our search strategy was very selective and addressed only a narrow slice of the published literature with a topical review of identified papers. It is likely problematic to assess overall levels of evidence of research from different areas of child abuse and neglect because each of these areas needs differing study designs given the research questions posed and the state of knowledge in that area; studies of outcomes, for example, ideally need random assignment of the intervention. We also did not have the resources to perform a systematic review using the PRISMA guidelines (<http://www.prisma-statement.org/>). Our categorization of article information was limited, relying on published abstracts and not full articles unless the abstract was unclear or incomplete or may have resulted in more than one article reflecting results of a particular study; this approach resulted in a potential overcount. Our review also does not include more recent articles or those as yet uncategorized in *PubMed*, which could have resulted in an undercount. It also does not include a number of additional search engines, lists of references, or libraries. We also excluded articles that seemed to have a nonmedical or mental health focus, which may have resulted in our missing medical research. *PubMed* does contain a sizable number of citations from a variety of medical and child welfare journals, and more recent articles show promise with improved research design (Collier, Ramaiah, Glick, & Gottlieb, 2017; Levey et al., 2017). While our sampling is not and cannot realistically be considered exhaustive, our results likely represent a sizable sample of the medical research articles in the field over a decade and can be used to infer trends over time in the number of studies and level of evidence rather than considered a comprehensive review of all articles, topics, and journals.

Conclusions

Medical research in child abuse and neglect differs from overall research in child protection but mirrors other medical specialties in the level of evidence of its

published articles. There has been steady improvement in the number and level of evidence of articles that varies by the type of child maltreatment. Neglect and physical abuse research offers opportunities for development in the science of child abuse medical research, and biologic studies in adverse child experiences and CM outcomes show great potential. The Institute of Medicine (Petersen et al., 2014) has noted that more medical research is needed to further explore the processes and outcomes of the medical evaluation of child abuse and neglect, to support the development of more uniform approaches to practice, and to arrive at a medical consensus regarding thresholds for reporting neglect. Additional needs identified by the IOM include effective training of multidisciplinary researchers, a high-quality public health surveillance system, sustained funding for rigorous research endeavors, interdisciplinary research centers, and research attentive to diverse and underserved populations (Cohn, Salmon, & Stobo, 2002). Also needed are continued federal investment in longitudinal, nationally representative studies, and quality improvement in administrative data, including increased attention to establishing causality in developmental research and intervention studies (Diaz & Petersen, 2014; Krugman, 2016; Sege, 2016). Sege (2016) has noted that many of the answers to important questions about child abuse and neglect lie “well within the capacity of modern science (p. 234).”

We speculate that with additional research funding and publication outlets (e.g., a journal dedicated to child abuse pediatrics research), there can be advancement in the number and quality of published medical research articles to answer important biomedical and social questions about this devastating public health problem facing our children and families. Increased funding for child abuse pediatrics research and improvements in study design will be needed to further improve medical research in child abuse and neglect.

About the Authors

Vincent J. Palusci, MD, MS, FAAP, is Professor of Pediatrics at New York University School of Medicine. He chairs the Hassenfeld Children’s Hospital Child Protection Committee and is a general and child abuse pediatrician at NYU Langone Health and Bellevue Hospital in New York City. He is a former editor in chief of the *Advisor*, a past member of the APSAC Board of Directors, and is currently president of APSAC–New York, Inc. Contact: Corresponding author is Vincent.palusci@nyulangone.org, 212.562.6073.

Jessica Perfetto, MD, graduated from New York University School of Medicine in 2018. She is currently a first-year resident in the Pediatrics Residency Program at the Children’s Hospital of Philadelphia. Contact: perfetto@email.chop.edu.

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

References

An Overview of Published Medical Research About Child Abuse and Neglect During 2006-2015

- American Academy of Pediatrics (AAP), Steering Committee on Quality Improvement and Management. (2004). Classifying recommendations for clinical practice guidelines. *Pediatrics*, 114(3), 874–877.
- Berlin, J. A., & Golub, R. M. (2014). Meta-analysis as evidence: Building a better pyramid. *Journal of the American Medical Association*, 312(6), 603–605.
- Block, R. W., & Palusci, V. J. (2006). Child abuse pediatrics: A new pediatric subspecialty. *Journal of Pediatrics*, 148, 711–712.
- Buckley, B., Corrigan, C., & Kerrins, L. (2010). *CAAB research report no. 7: Report of an audit of child protection research in Ireland, 1990–2009*. Dublin: Trinity College School of Social Work and Social Policy and Children’s Research Centre. Retrieved from <http://www.tara.tcd.ie/bitstream/handle/2262/41271/Full-Report-Audit-of-Child-Protection.pdf;jsessionid=D3177C8F5937AD1567140A65E1479DB1?sequence=1>

- Choudhary, A. K., Servaes, S., Slovis, T. L., Palusci, V. J., Hedlund, G. L., Narang, S. K., ... Offiah, A. C. (2018). Consensus statement on abusive head trauma in infants and young children. *Pediatric Radiology*, 48(8), 1048–1065.
- Cohn, A. E. (1938, October). The meaning of medical research. *Bulletin of the New York Academy of Medicine*, 14(5), 265–291.
- Cohn, F., Salmon, M. E., & Stobo, J. D. (Eds.). (2002). *Confronting chronic neglect: The education and training of health professionals on family violence*. Washington, DC: Institute of Medicine, National Academy Press.
- Collier, Z. J., Ramaiah, V., Glick, J. C., & Gottlieb, L. J. (2017). A 6-year case-control study of the presentation and clinical sequelae for noninflicted, negligent, and inflicted pediatric burns. *Journal of Burn Care Research*, 38, e101–e124.
- CORE INFO: Cardiff Child Protection Systematic Reviews. (2017). Home page. Retrieved April 19, 2017, from <http://www.core-info.cardiff.ac.uk>
- Diaz, A., & Petersen, A. C. (2014). Institute of Medicine report: New directions in child abuse and neglect research. *JAMA Pediatrics*, 168(2), 101–102.
- Fletcher, R. N., & Fletcher, S. W. (1979). Clinical research in general medical journals. *New England Journal of Medicine*, 301, 180–183.
- Hayden, G. F., & Saulsbury, F. T. (1982). A review of the Journal of Pediatrics: The first 50 years. *Journal of Pediatrics*, 110, 5–11.
- Hellems, M. A., Burka, K. K., & Hayden, G. F. (2009). A review of the Journal of Pediatrics: The first 75 years. *Journal of Pediatrics*, 155, 16–20.
- Higgins, D. J., Adams, R. M., Bromfield, L. M., Richardson, N., & Aldana, M. S. (2005). *National audit of Australian child protection research, 1995–2004*. Melbourne: Australian Institute of Family Studies. Retrieved from <https://aifs.gov.au/cfca/sites/default/files/publication-documents/audit.pdf>
- Higgins, J. P. T., & Green, S. (Eds.). (2011, March). *Cochrane handbook for systematic reviews of interventions, Version 5.1.0*. The Cochrane Collaboration. Available from <https://training.cochrane.org/handbook>.
- Jones, C., Taylor, J., MacKay, K., Soliman, F., Clayton, E., Gadda, A. M., ... Jones, D. (2017). The landscape of U.K. child protection research [from] 2010 to 2014: A mapping review of substantive topics, maltreatment types, and research designs. *Child Abuse Review*, 26, 8–18.
- Kempe, C. H., Silverman, F. N., Steele, B. F., Droegemueller, W., & Silver, H. K. (1962). The battered-child syndrome. *Journal of the American Medical Association*, 181(1), 17–24.
- Kim, H., Wildeman, C., Jonson-Reid, M., & Drake, B. (2017). Lifetime prevalence of investigating child maltreatment among U.S. children. *American Journal of Public Health*, 107, 274–280.
- Krugman, R. D. (2016). Pediatric research and child maltreatment: Where have all the flowers gone? *Pediatric Research*, 79(1), 236–237.
- Levey, E. J., Gelaye, B., Bain, P., Rondon, M. B., Borba, C. P. C., Henderson, D. C., & Williams, M. A. (2017). A systematic review of randomized controlled trials of interventions designed to decrease child abuse in high-risk families. *Child Abuse & Neglect*, 65, 48–57.
- Lindberg, D. M., Wood, J. N., Campbell, K. A., Scribano, P. V., Laskey, A., Leventhal, J. M., ... Runyan, D. K. (2017). Research priorities for a multi-center child abuse pediatrics network—CAPNET. *Child Abuse & Neglect*, 65, 152–157.

- McDermott, M. M., Lefevre, F., Feinglass, J., Reifler, D., Dolan, N., Potts, S., & Senger, K. (1995). Changes in study design, gender issues, and other characteristics of clinical research published in three major medical journals for 1971–1991. *Journal of General Internal Medicine*, *10*, 13–18.
- Nguyen, A., & Mahabir, R. C. (2016). An update on the level of evidence for plastic surgery research published in Plastic and Reconstructive Surgery. *Plastic and Reconstructive Surgery—Global Open*, *4*, e798.
- Oxford Centre for Evidence-Based Medicine (OCEBM). (2009, March). Levels of evidence. Available from: <https://www.cebm.net/category/ebm-resources/loe/> Retrieved from <http://www.cebm.net/oxford-centre-evidencebased-medicine-levels-evidence-march-2009/>
- Oxford Centre for Evidence-Based Medicine, OCEBM Levels of Evidence Working Group. (2011). The Oxford 2011 levels of evidence table. Available from <https://www.cebm.net/category/ebm-resources/loe/> Retrieved from <http://www.cebm.net/wpcontent/uploads/2014/06/CEBM-Levels-of-Evidence-2.1.pdf>
- Parfrey, P., & Ravani, P. (2009). On framing the research question and choosing the appropriate research design., *Methods of molecular biology*, *473*, 1-17.
- Petersen, A. C., Joseph, J., & Feit, M. (Eds.). (2014). *New directions in child abuse and neglect research*. Washington, DC: Institute of Medicine and National Research Council (IOM), The National Academies Press.
- Rotter, N. (2016). Evidence and evidence gaps in therapies of nasal obstruction and rhinosinusitis. *GMS Current Topics in Otorhinolaryngology—Head and Neck Surgery*, *15*, 1–23.
- Sargeant, J. M., Kelton, D. F., & O'Connor, A. M. (2014). Study designs and systematic reviews of interventions: Building evidence across study designs. *Zoonoses and Public Health*, *61*(suppl. 1), 10–17.
- Scribano, P. V. (2012). Child maltreatment—An update on new science to a vexing pediatric problem. *Clinical Pediatric Emergency Medicine*, *13*(3), 153–154.
- Sege, R. D. (2016). Child abuse research 2015: It's time for breakthroughs. *Pediatric Research*, *79*(1), 234–235.
- Servaes, S., Stephen, D., Brown, S. D., Choudhary, A. K., Christian, C. W., Done, S. L. ... Slovis, T. L. (2016). The etiology and significance of fractures in infants and young children: A critical multidisciplinary review. *Pediatric Radiology*, *46*(5), 591–600.
- Shin, J. J., Rauch, S. D., Wasserman, J., Coblenz, O., & Randolph, G. W. (2011). Evidence-based medicine in otolaryngology, part 2: The current state of affairs. *Otolaryngology and Head & Neck Surgery*, *144*(3), 331–337.
- Tanaka, M., Jamieson, E., Wathen, N., & MacMillan, H. L. (2010). Methodological standards for randomized controlled trials of interventions for preventing recurrence of child physical abuse and neglect. *Child Abuse Review*, *19*, 21–38.
- Taylor, J., Mackay, K., Gadda, A., Soliman, F., Clayton, E., Jones, C., ... Anderson, A. (2015). *The landscape of child protection research in the U.K.: A U.K. mapping review*. Edinburgh: University of Edinburgh Child Protection Research Centre/NSPCC.
- Tran, B. X., Van Pham, T., Ha, G. H., Ngo, A. T., Nguyen, L. H., Vu, T. T. M., ... Ho, R. C. M. (2018). A bibliometric analysis of the global research trend in child maltreatment. *International Journal of Environmental Research and Public Health*, *15*, 1456. doi:10.3390/ijerph15071456
- U.S. Department of Health and Human Services (US DHHS), Administration for Children and Families, Administration on Children, Youth and Families, Children's Bureau. (2017). Child maltreatment 2015. Available from <http://www.acf.hhs.gov/programs/cb/research-data-technology/statistics-research/child-maltreatment>