Child Abuse & Neglect 50 (2015) 218–227

Contents lists available at ScienceDirect

Child Abuse & Neglect

Research article

Defining 'reasonable medical certainty' in court: What does it mean to medical experts in child abuse cases?

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ARTICLE INFO

Article history:
Received 21 July 2015
Received in revised form
28 September 2015
Accepted 27 October 2015
Available online 14 November 2015

Keywords:
Child abuse
Testimony
Reasonable medical certainty
Expert witness
Justice

ABSTRACT

Physicians and others who provide expert testimony in court cases involving alleged child abuse may be instructed to state their conclusions within a 'reasonable medical certainty' (RMC). However, neither judges nor jurors knows what degree of probability constitutes RMC for a given expert, nor whether different experts use different standards to formulate their opinions. We sought to better understand how experts define RMC in the context of court cases. An email survey was sent to members of six list-serves, representing four specialties, whose members testify in child abuse cases. Respondents were asked to define how RMC corresponded to (1) the numerical probability that abuse occurred, (2) the ordinal probability, and (3) how their determinations relate to common legal standards ('preponderance of the evidence', 'clear and convincing', and 'beyond a reasonable doubt'). Participants were also asked how comfortable they were in defining RMC; whether their definition changed according to the charges or type of proceeding; and how they would apply RMC to several hypothetical cases. The 294 list-serve participants who responded included child abuse pediatricians (46%), forensic pathologists (21%), pediatric neurosurgeons (15%), pediatric ophthalmologists (12%), and others (6%). Though 95% of respondents had testified in court, only 45% had received training in the definition of RMC. Only 37% were comfortable defining RMC. Although many responses were highly clustered and paired comparisons showed that 95% of participants' responses were internally consistent, there was variability in respondents' definitions of RMC. There is some variability in how child abuse expert witnesses define and use the term RMC; we provide suggestions about how to more accurately and transparently define RMC to ensure justice in these cases.

Introduction

Individuals with expertise in treating and/or diagnosing suspected abusive injuries in children are often called upon by attorneys to provide independent expert analysis in courts of law. This expert medical testimony is vital in such cases; the interpretation of the medical findings by these experts provides insight into the nature and cause of the child's injuries. These expert medical witnesses are commonly asked to express their opinions in terms of 'reasonable medical certainty' (or in some jurisdictions 'reasonable degree of medical certainty,' 'reasonable medical probability,' or other terminology

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http://dx.doi.org/10.1016/j.chiabu.2015.10.027
0145-2134/

considered to be synonymous for the present inquiry). In many cases, however, (1) how to interpret 'reasonable medical certainty' (RMC) is left to the discretion of the individual expert; (2) experts are seldom asked to render to the court a numerical or nominal probability that abuse did (or did not) occur, despite the court's reliance on this opinion in reaching a verdict; (3) it is not clear whether medical experts use the same threshold of probability when expressing RMC; and (4) there is no present standard for operationalizing the term. It is unclear how much variability exists in the interpretation and application of RMC, and to what extent this variability might influence justice.

We therefore sought to determine, among professionals called upon to testify in cases of alleged child abuse, what probabilistic threshold expert witnesses use in defining RMC, and how this threshold varies depending on various circumstances commonly encountered in court cases.

In prior studies with both pediatricians and child abuse experts, we have found variable thresholds for what constitutes 'reasonable suspicion of abuse,' as well as marked (>85%) internal inconsistency between individuals' formulations of reasonable suspicion using ordinal probability versus numerical probability frameworks (Levi & Brown, 2005; Levi & Crowell, 2011). Consequently, we hypothesized that there would be variability among these experts in their definitions of RMC, and that the thresholds they identified would not be consistent across either definitional frameworks or case scenarios.

Methods

Following extensive review of the medical and legal professional literature, a 28-item survey was developed to determine how the term 'reasonable medical certainty' (RMC) is interpreted by professionals who treat and/or diagnose (alleged) child abuse, and who thus are called upon to testify in court. This survey is reproduced *in toto* on-line as supplementary material. The survey was pilot-tested for face- and construct-validity, and comprised four sections. The first section asked respondents to define RMC using each of the following three frameworks: (I) The estimated numerical probability that abuse had occurred (≥25%, ≥50%, ≥60%, ≥70%, ≥80%, ≥90%, ≥95%, ≥98%, or ≥99%); II) the estimated ordinal probability that child abuse had occurred (i.e., 1st most likely diagnosis, 2nd most likely, 3rd, 4th, or 5th); and III) to which of three legal standards ('preponderance of the evidence', 'clear and convincing', or 'beyond a reasonable doubt') their RMC definition most closely mapped. Respondents were also asked if (and how) their interpretations of RMC varied depending on the setting (family court versus criminal court) or the criminal charge (assault and battery versus murder). Additionally, respondents were asked how comfortable they were using the term RMC. The second section of the survey posited six clinical scenarios of varying complexity and ambiguity, and respondents were asked to indicate if they felt there was RMC that abuse had occurred. The third section comprised four statistical items that tested whether respondents could correlate numerical likelihoods with proportions. The final section requested basic demographic information regarding a variety of personal and professional characteristics.

We chose to survey experts who were likely to have testified in cases of suspected abusive head trauma (child abuse pediatricians, pediatric neurosurgeons, pediatric ophthalmologists, and forensic pathologists) because these cases often involve the most significant consequences for both the child and the person(s) charged with having caused such injuries. The research was approved by the Institutional Review Board (IRB) of Penn State University College of Medicine.

Following IRB approval and waiver of written informed consent (in accord with U.S. federal regulation 45 CFR part 46.116[d]), the survey was distributed via email to members of six list-serves chosen for their penetrance of professionals most likely to be involved in the treatment and/or diagnosis of children with abusive head trauma, and hence likely to provide expert medical testimony in such cases that went to court. These included the *Special Interest Group on Child Abuse* and *Helfer Society* list-serves, representing clinicians and researchers in the field of child abuse pediatrics; the *National Association of Medical Examiners* list-serve, representing forensic pathologists; the *Joint Section on Pediatric Neurosurgery* list-serve, representing pediatric neurosurgeons; the *American Academy of Pediatric Ophthalmology and Strabismus* list-serve, representing pediatric ophthalmologists; and the *Evidence Based Medicine* list-serve, representing an eclectic group of professionals who provide independent testimony in child abuse (predominantly abusive head trauma) cases. The email provided the rationale for the research study as well as a private link to an Internet survey provider (Survey Monkey, www.surveymonkey.com, Palo Alto, CA) to participate in the survey.

All results were analyzed using SAS (SAS Institute, Carey, NC). A univariate analysis identified significant correlations between variables that were then used to build a multivariate model to identify independently significant variables with statistical significance (defined by a p value of <0.05). Since the numerical probability scale in the survey was neither point specific (that is, respondents were asked to choose a threshold value of 'greater than or equal to' a designated numerical probability, rather than a specific point probability) nor linear (the scale values being 25%, 50%, 60%, 70%, 80%, 90%, 95%, 98% and 99%), the absolute calculated means for the collective answers among a group of individuals were not necessarily meaningful; however, we felt that using these calculated means *between* two groups to identify statistically significant intergroup differences was likely valid.

Analysis of paired comparisons relied on (1) commonplace interpretations of the legal standards used in this study (a 'preponderance of the evidence' (POE) standard as ≥51% probability, a 'clear and convincing evidence' (CCE) standard as ≥70%, and a 'beyond a reasonable doubt' standard as ≥90% (Simon & Mahan, 1971), and (2) the logical relationship between numeric probability and ordinal probability as they pertain to a differential diagnosis (Levi & Brown, 2005). In common medical parlance, a differential diagnosis is the list a physician constructs of the most likely explanations for a given clinical scenario, where each possible diagnosis has (or can be assigned) a probability of being the correct explanation