Health-Related Quality of Life Among Adults Who Experienced Maltreatment During Childhood

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Objectives. We sought to assess the difference in a preference-based measure of health among adults reporting maltreatment as a child versus those reporting no maltreatment.

Methods. Using data from a study of adults who reported adverse childhood experiences and current health status, we matched adults who reported childhood maltreatment (n = 2812) to those who reported no childhood maltreatment (n = 3356). Propensity score methods were used to compare the 2 groups. Health-related quality-of-life data (or "utilities") were imputed from the Medical Outcomes Study 36-Item Short Form Health Survey using the Short Form–6D preference-based scoring algorithm.

Results. The combined strata-level effects of maltreatment on Short Form–6D utility was a reduction of 0.028 per year (95% confidence interval = 0.022, 0.034; $P < .001$). All utility losses for the childhood-maltreatment versus no-childhood-maltreatment groups by age group were significantly different: 18–39 years, 0.042; 40–49 years, 0.038; 50–59 years, 0.023; 60–69 years, 0.016; 70 or more years, 0.025.

Conclusions. Persons who experienced childhood maltreatment had significant and sustained losses in health-related quality of life in adulthood relative to persons who did not experience maltreatment. These data are useful for asessing the cost-effectiveness of interventions designed to prevent child maltreatment in terms of cost per quality-adjusted life years saved. (*Am J Public Health.* 2008;98: 1094–1100. doi:10.2105/AJPH.2007.119826)

There is increasing evidence that exposure to childhood maltreatment can lead to greater susceptibility to lifelong physical and mental heath problems, including cardiovascular disease, hypertension, diabetes, anxiety disorders, depression, substance abuse, and perpetration of future violence.[1–7] Childhood maltreatment can be defined as any act or series of acts of commission or omission by a parent or other caregiver, in the context of a relationship of responsibility, trust, or power, that results in harm, potential for harm, or threat of harm to a child's health, survival, development, or dignity.[8,9]

Childhood maltreatment poses a substantial risk for long-term health for many reasons. First, recurrent exposure to the stress associated with maltreatment can lead to potentially irreversible changes in the interrelated brain circuits and hormonal systems that regulate stress.[10–12] Changes in these brain systems can lead to a premature physiological aging of the body that increases vulnerability to disease over the life course.[11,12] Second, childhood maltreatment increases the risk of behavioral problems such as smoking, substance abuse, obesity, and sexual promiscuity.[1,13] Third, a related body of evidence indicates that early adverse childhood experiences have a profound effect on a range of cognitive, social, and emotional competencies that lay the foundation for successful learning, coping, and subsequent economic productivity.[13–16]

This broad range of childhood maltreatment's impact on health suggests that it may also have an impact on victims' life expectancy and long-term health-related quality of life (HRQoL). When assessed together, these outcomes provide information on the effect that childhood maltreatment has on victims' remaining quality-adjusted life years (QALYs), which is a composite measure of health typically used in economic evaluations of health interventions such as cost-effectiveness analyses.[17–21]

Assessment of the impact of childhood maltreatment on the first of the 2 components of the QALY—life expectancy—is relatively straightforward. It requires good epidemiological data on mortality outcomes associated with the acute and chronic phases of childhood maltreatment. Assessment of the impact of childhood maltreatment on the second component, HRQoL, is more complicated. When following national guidelines for conducting cost-effectiveness analyses,[17,22,23] measures of HRQoL should reflect relative desirability of different health outcomes under consideration for the population of interest. Preference-based measures provide a summary value for a respondent's valuation of the quality of life of a particular health state, incorporating all positive and negative aspects of a health state into a single number.

A commonly used approach for valuing preferences in health is "utility." A utility weight is typically scaled between 1, representing perfect health, and 0, representing a health state judged equivalent to being dead. Decrements in HRQoL, as measured by utility weights on this scale, are then multiplied by length of life to estimate the QALYs associated with and without the intervention under consideration. These preferences, or utilities, can be directly elicited from the affected population or can be indirectly derived through the use of well-developed, generally accepted, and widely used generic HRQoL indexes whose valuation is based on general population samples.[24–28]

For health outcomes resulting from physical abuse, sexual abuse, psychological abuse, neglect, or any combination thereof, few if any studies have either directly or indirectly elicited utilities. The paucity of data, particularly for health states associated with childhood maltreatment, is most likely because of a variety of practical and methodological challenges.[29] These include the difficulty in defining an average health state for acute or ongoing violent episodes, the cognitive challenges in eliciting preferences for health outcomes from children, proxy issues concerning parents or caregivers who are often the perpetrators of maltreatment, and other reasons

associated with development of the field of childhood maltreatment prevention and priorities for research.[30,31]

Only a few studies have assessed the long-term impact of childhood maltreatment on HRQoL,[32–35] but these have included summary measures of health that are not preference based. One summary measure of health, the Medical Outcomes Study 36-Item Short Form Health Survey (SF-36),[36] is a commonly used health-state classification instrument. Edwards et al. compared self-reports of health on the SF-36 in an adult population to an index measure of the number of adverse exposures, including childhood maltreatment, experienced during childhood (the adverse childhood experiences [ACE] score).[32] The authors found an inverse relationship between ACE score (on which the more adverse experiences, the higher the score) and the SF-36 overall summary measure. However, the summary measure derived from the SF-36 measures health on a scale from 0 (worst health) to 100 (best health) but does not explicitly incorporate preferences into its scoring algorithm and, therefore, cannot be used to obtain preference weights for constructing the QALY. Alternatively, preference-based measures of HRQoL reflect relative desirability of a score (or index on a scale) based on tradeoffs that one would make on life expectancy to achieve better HRQoL.[23]

Fortunately, new methods have been developed that enable one to translate summary measures of HRQoL into preference-based measures of HRQoL for use in cost-effectiveness analyses. This represents an exciting advance in methodology, particularly as it is applied to health outcomes associated with violence that have received such little attention in terms of eliciting preference-based measures of HRQoL. We sought to derive preference-based values for childhood maltreatment outcomes derived from summary measures of health defined by adults self-reporting maltreatment outcomes during childhood. These results, when incorporated with epidemiological data on life expectancy, will provide a means for assessing lifetime losses in QALYs and for conducting cost-effectiveness analyses of interventions designed to prevent childhood maltreatment.

METHODS

Study Population

Data were originally collected as part of the second survey wave of the Adverse Childhood Experiences Study at Kaiser Permanente's Health Appraisal Clinic in San Diego, California, between June and October 1997. Complete descriptions of the study population and several analyses of this large database are available elsewhere.[1,32] Basic demographic information was collected from participants, as well as data on adverse events experienced during childhood, current health status as measured by the SF-36, health risk behaviors, and diseases past and present. Table 1 lists the questions used to measure adverse childhood experiences. Five categories of childhood maltreatment were included, with questions adapted from previously developed scales: physical abuse,[37] sexual abuse,[38] emotional abuse,[37] physical neglect,[39] and emotional neglect.[39] An additional 5 categories of questions were asked regarding other adverse experiences during childhood, including household substance abuse, household mental illness, violent treatment of mother, household member in prison, and parental separation or divorce.

Data Analysis

Our main outcome measure of interest was a preference-based HRQoL measure, or utility, for 2 populations—adults who self-reported childhood maltreatment during the first 18 years of life (cases) and those who did not report maltreatment during childhood (controls).

Health utility measures were calculated using the Brazier algorithm (provided by Brazier) that transforms a summary measure of health into a preference-based measure of health. Brazier et al.[40] first reduced a summary measure of health, the SF-36, into a 6-dimensional health state classification system, the Short Form–6D (SF-6D). The SF-6D includes physical functioning, role imitations, social functioning, pain, mental health, and vitality. Then they directly elicited preference-based measures of HRQoL, or utilities, for a variety of health states defined by the SF-6D from 165 health professionals and patients in the United Kingdom. Following positive outcomes from this pilot work, Brazier et al.[41] refined the original models by using a representative sample of the general public (n=836). Several models were tested, with the fixed effects and random effects models being the most appropriate, with utility values as the dependent variable and personal characteristics and dummies for each level of the SF-6D as independent variables. Parameters were estimated from these models and then used for the population to estimate utility indices from the SF-6D. Subsequent studies have tested the validity and reliability of the transformation formula, and it is now seen as a promising method for deriving utilities or preference-based measures of health states from summary health data.[41,42]

Because our study relied on a large observational study with cases (the childhood-maltreatment group) being assigned to experimental units without the benefits of randomization, systematic differences were likely to exist between individuals in the childhood-maltreatment and no-childhood-maltreatment groups with respect to confounding covariates such as other adverse childhood experiences and socioeconomic status. Simple comparisons of HRQoL measures between childhood maltreatment and no childhood maltreatment are potentially misleading or biased in that the differences of health utility between the 2 groups could be explained by systematic between-group differences rather than as the effect of maltreatment per se.

Therefore, we use the method of stratification based on the propensity score, a scalar function of the covariates, to approximate a randomized controlled setting and to reduce bias in estimating marginal impacts of childhood maltreatment on predicted utility in an observational study.[43,44] The method involved dividing units into 5 age groups and then dividing them into quintiles based on the propensity score within each age group (for a total of 25 strata). Health utility measures of childhood maltreatment and no childhood maltreatment were compared for those who fell into the same strata. An overall effect of childhood maltreatment on utility was estimated by using a weighted average of the within-strata estimates with the weights equal to the proportions of the population within the strata.

TABLE 1—Questions Used to Define Childhood Maltreatment Outcomes and Other Adverse Childhood Exposures Among Respondents (N = 6168): Wave 2, Adverse Childhood Experiences Study at Kaiser Permanente Health Appraisal Clinic, San Diego, California, 1997

Category	Question[a]	Response Options	Criterion for Category
	Childhood maltreatment		
Physical abuse	Did a parent or other adult in the household:	Never, once or twice, sometimes, often, very often	
	Push, grab, shove, or slap you?		
	Hit you so hard that you had marks or were injured?		Often or very often; or Sometimes, often, very often
Sexual abuse	Did an adult 5 years older than you:	Yes, No	Yes to any question
	Touch or fondle you in a sexual way?		
	Have you touch his or her body in a sexual way?		
	Attempt intercourse (oral, vaginal, or anal) with you?		
	Have intercourse (oral, vaginal, or anal) with you?		
Emotional abuse	Did a parent or other adult in the household:	Never, once or twice, sometimes, often, very often	Often or very often to any question
	Swear at, insult, or put you down?		
	Act in a way that made you afraid you would be physically hurt?		
	Threaten to hit or throw something at you but didn't?		
Physical neglect	I didn't have enough to eat.	Never (1), rarely (2), sometimes (3), often (4), very often (5)	Summary score of 15+
	I knew there was someone there to take care of me and protect me.		
	My parents were too drunk or too high to take care of me.		
	I had to wear dirty clothes.		
	There was someone to take care of me if I needed it.		
Emotional neglect	There was someone in my family who helped me feel important or special.	Never (1), rarely (2), sometimes (3), often (4), very often (5)	Summary score of 15+
	People in my family looked out for each other.		
	I felt loved.		
	People in my family felt close to each other.		
	My family was a source of strength and support.		
	Other adverse childhood experiences		
Witnessing maternal violence	Did your father or stepfather or mother's boyfriend ever:	Never, once or twice, sometimes, often, very often	
	Push, grab, slap, or throw something at your mother or stepmother?		
	Kick, bite, or hit her with a fist or something hard?		Often or very often; or
	Repeatedly hit her over at least a few minutes?		Sometimes, often, or very often; or
	Threaten or hurt her with a knife or gun?		Once or twice, sometimes, or very often; or Once or twice; or
Household mental illness	Was someone in your household depressed or mentally ill?	Yes, No	Yes to either question
	Did someone in your household attempt suicide?		
Household substance abuse	Was someone in your household a problem drinker or alcoholic?	Yes, No	Yes to either question
	Did you live with anyone who used street drugs?		
Household criminal activity	Did a household member ever go to prison?	Yes, No	Yes
Parental divorce or separation	Were your parents ever divorced or separated?	Yes, No	Yes

[a]All questions began with "Before the age of 18 years. . . ."

To assess the marginal impact of each type of childhood maltreatment on utility, logistic regression models were estimated with imputed health utility as the outcome variable and 5 types of maltreatment as predictors for all 25 strata. Similar to estimating the overall effect of childhood maltreatment on utility, the overall impact of each type of maltreatment on utility were weighted and combined across all 25 strata to determine the overall impact of that type of childhood maltreatment on utility.

To create the propensity score, which was defined as the predicted probability of being maltreated during childhood, we estimated a multiple logistic regression predicting childhood maltreatment by using a number of covariates as explanatory variables. These covariates included basic demographics (gender, age, age squared, race), family economic variables found to be related to childhood maltreatment in previous research (mother's years of education, log of number of residential moves in childhood, whether parent owned own home),[45,46] and the other 5 categories of adverse childhood experiences described previously and in Table 1. The rationale for using

the other adverse childhood experiences as covariates was to determine the marginal impact of childhood maltreatment on utility. The model, therefore, adjusted for exposure to other adverse childhood experiences as potential confounders.

Significance tests for all key variables were conducted between the childhood-maltreatment and no-childhood-maltreatment groups within each of the 25 strata for both before and after subclassification. We used an analysis of variance (ANOVA) to evaluate differences in prevalence of key variables that were continuous and a 2-sided Pearson χ^2 test for variables that were categorical. A P value of less than .05 was considered significant in this analysis.

RESULTS

Of the 8667 respondents in the second survey wave of the Adverse Childhood Experiences Study, 7641 (88%) agreed to complete the SF-36, and 6815 (78.6%) completed all questions. An additional 647 respondents were excluded because they were missing information on childhood maltreatment (n=25) or on covariates used to develop the propensity score (n=622). Of the 6168 respondents who remained, the average age of participants was 55.4 years (SD=14.9), 53% were women, 76% were White, and 45.6% (n=2812) self-reported some form of maltreatment during childhood. Respondents that remained did not differ substantially on demographic characteristics from the original sample. For example, those respondents who remained in the analyses were similar in age (55.4 years vs 55.9 years) and were more likely to be men (by 1.1%) and White (by 2.1%) compared with the original sample. Therefore we feel that the respondents included in this analysis were representative of Kaiser Permanente's population.

Table 2 contains the prevalence of each individual form of childhood maltreatment, as well as the correlation between maltreatment types. Physical abuse had the highest prevalence of any of the abuse types (26%), whereas physical neglect was reported by the fewest participants (9%). Each maltreatment type was modestly to moderately correlated ($P<.05$), with the highest correlations between emotional abuse and emotional neglect (0.43), although physical abuse and emotional abuse were nearly as highly correlated (0.42).

A number of key variables were significantly different between the maltreated and nonmaltreated populations, as previously analyzed and reported by the Adverse Childhood Experience Study investigators.[47,48] In particular, persons in all age groups who reported childhood maltreatment also reported significantly higher percentages of the other 5 measured adverse childhood experiences, compared with those who reported no childhood maltreatment. The measured economic variables were also significantly associated with childhood maltreatment. After we applied the stratified propensity score method, only 1 of the 25 strata had a significantly different mean propensity score, but the magnitude of the difference within this strata was slight (a score of 0.76 in the maltreated group vs 0.73 in the nonmaltreated group). Therefore, we concluded that the overall matching process was successful in reducing bias between the childhood-maltreatment and no-childhood-maltreatment groups.[43,44,49]

Table 3 shows overall mean utility differences comparing the childhood-maltreatment group with the no-childhood-maltreatment group by age group and type of maltreatment. Overall, respondents who reported childhood maltreatment had a marginal utility difference (or disutility) of 0.028 (95% confidence interval [CI]=0.022, 0.034) compared with respondents who reported no childhood maltreatment. This result is in the range of what Walters and Brazier[50] estimated as a minimally important difference (0.011 to 0.097) in utility for the SF-6D as measured in 11 studies. For every age group, the overall marginal difference in utilities for those reporting childhood maltreatment compared with those reporting no maltreatment were statistically significant at $P<.05$, with the largest difference occurring in the group aged 20 to 39 years and the smallest difference occurring in the group aged 60 to 69 years. Imputed utility scores by age group are provided for childhood-maltreatment and no-childhood-maltreatment groups in Table 4.

Table 3 shows that, across all ages, emotional neglect had the strongest influence on the marginal disutility, followed by sexual abuse and physical abuse. Neither emotional abuse nor physical neglect significantly impacted the disutility across all age groups. However, type of maltreatment impacted the disutility differentially within each age group. For example, among those aged 19 to 49 years, physical abuse, sexual abuse, and emotional neglect significantly impacted disutility. Among those aged 50 to 59 years, however, only physical abuse significantly impacted disutility, and among those aged 60 to 69 years, only sexual abuse and emotional neglect significantly impacted disutility. Among those 70 years and older, only emotional abuse significantly impacted disutility. In fact, the influence of emotional abuse on disutility was only significant among those 70 years and older.

TABLE 2—The Prevalence and Intercorrelation Between Types of Childhood Maltreatment Among Respondents (N = 6168): Wave 2, Adverse Childhood Experiences Study at Kaiser Permanente Health Appraisal Clinic, San Diego, California, 1997

		Correlations				
Childhood Maltreatment Type	Prevalence, No. (%)	Physical Abuse	Sexual Abuse	Emotional Abuse	Physical Neglect	Emotional Neglect
Physical abuse	1609 (26)	1.00				
Sexual abuse	1298 (21)	0.16	1.00			
Emotional abuse	626 (10)	0.42	0.16	1.00		
Physical neglect	558 (9)	0.20	0.12	0.24	1.00	
Emotional neglect	876 (14)	0.30	0.16	0.43	0.37	1.00

DISCUSSION

We found that persons who experienced maltreatment during childhood had significant

TABLE 3—Marginal Utility Differences (95% Confidence Intervals) Between Childhood-Maltreatment and No-Childhood-Maltreatment Groups, by Age Group and Type of Maltreatment: Wave 2, Adverse Childhood Experiences Study at Kaiser Permanente Health Appraisal Clinic, San Diego, California, 1997

Age Group, y	Any Childhood Maltreatment	Physical Abuse	Sexual Abuse	Emotional Abuse	Physical Neglect	Emotional Neglect
19–39	0.042* (0.027, 0.056)	.023* (0.004, 0.042)	0.029* (0.011, 0.046)	0.003 (–0.029, 0.035)	0.018 (–0.013, 0.049)	0.039* (0.015, 0.063)
40–49	0.038* (0.025, 0.051)	0.021* (0.006, 0.036)	0.019* (0.004, 0.035)	0.003 (–0.029, 0.023)	0.011 (–0.042, 0.020)	0.033* (0.011, 0.054)
50–59	0.023* (0.011, 0.036)	0.017* (0.002, 0.031)	0.005 (–0.010, 0.021)	0.007 (–0.026, 0.040)	0.014 (–0.014, 0.041)	0.015 (–0.008, 0.038)
60–69	0.016* (0.004, 0.029)	0.005 (–0.011, 0.022)	0.018* (0.003, 0.034)	0.004 (–0.034, 0.026)	0.011 (–0.016, 0.037)	0.028* (0.005, 0.050)
≥70	0.025* (0.010, 0.040)	0.011 (–0.012, 0.033)	0.012 (–0.007, 0.031)	0.051* (0.009, 0.093)	0.027 (–0.007, 0.061)	0.017 (–0.014, 0.047)
All	0.028* (0.022, 0.034)	0.015* (0.007, 0.023)	0.016* (0.009, 0.023)	0.010 (–0.005, 0.025)	0.013 (–0.030, 0.056)	0.026* (0.015, 0.037)

Note. A utility value is a preference-based measure of health-related quality of life (HRQoL), which is typically scaled between 1, representing perfect health, and 0, representing a health state judged equivalent to being dead. Decrements in preference-based HRQoL as measured by utility weights are provided in this table. The weights can be multiplied by length of life to estimate the marginal decrease in quality-adjusted life years for each maltreatment group relative to a no-maltreatment group.
*$P < .05$.

TABLE 4—Predicted Utilities, by Sample Populations Among Respondents (N = 6168): Wave 2, Adverse Childhood Experiences Study at Kaiser Permanente Health Appraisal Clinic, San Diego, California, 1997

Age Group, y	No Childhood Maltreatment	Childhood Maltreatment
19–39	0.7990	0.7575
40–49	0.7863	0.7481
50–59	0.7873	0.7642
60–69	0.7815	0.7650
≥70	0.7534	0.7295
All	0.7813	0.7534

Note. A utility value is a preference-based measure of health-related quality of life (HRQoL), which is typically scaled between 1, representing perfect health, and 0, representing a health state judged equivalent to being dead. Decrements in preference-based HRQoL as measured by utility weights are provided in this table. The weights can be multiplied by length of life to estimate the average quality-adjusted life years remaining for each maltreatment group relative to a no-maltreatment group.

and sustained losses in preference-based HRQoL in adulthood, as measured by health utilities, compared with persons who did not experience maltreatment during childhood. Overall, adults who self-reported any form of childhood maltreatment had a yearly loss of 0.03 QALYs, or 11 days per year. Physical abuse, sexual abuse, and emotional neglect alone significantly reduced HRQoL per year by 0.015, 0.016, and 0.026 QALYs, respectively; emotional abuse or physical neglect alone did not. Preference-based HRQoL, or utility, losses among the childhood-maltreatment group compared with the no-childhood-maltreatment group significantly differed for all age groups, with higher differential losses in utilities found among the youngest age group (0.04 QALYs, or 15 days per year). These differential losses diminished with increasing age up until age 70 years and older, at which time the marginal difference in utility losses between the childhood-maltreatment and no-childhood-maltreatment groups increased.

Limitations and Potential Biases

The retrospective nature of the self-report data may be one explanation for the declining differences in utility as age increased, with the slight exception of the group 70 years and older. One might question the reliability of older age groups in self-reporting events that may have occurred, in some cases, more then a half century ago. However, there is accumulating evidence that suggests that the unreliability of retrospective reports of trauma is overstated.[51,52] For example, in another analysis that used the Adverse Childhood Experiences Study data, researchers found that Cohen's κ was in the good-to-excellent range when a test–retest reliability of the ACE measure was conducted.[53] In addition, other analyses from the Adverse Childhood Experiences Study have not found that the association between adverse childhood events and HRQoL decreases with age.[32]

The recollection of personally experienced events such as childhood maltreatment may have more to do with when the maltreatment occurred and other factors occurring during childhood than with the age of the respondent. Memories of events that occurred before age 3.5 years are very unlikely to be recalled and memories from the 3.5- to 6-year age range are also less likely to be recalled than those that occurred during a later age.[54] Older age when the maltreatment ended, maternal support following the disclosure of maltreatment, and more-severe maltreatment have all been found to be associated with an increased likelihood of disclosure.[55,56]

Another probable source of bias in our study relating to retrospective self reports of childhood maltreatment was that some cases of maltreatment may not have been self-identified. In a prospective study of women's memory of childhood sexual abuse, Williams[57] found, for example, that about 38% of abused women did not recall abuse that had been confirmed 17 years earlier. This type of misclassification would bias our results toward the null. It could be that the effect of childhood maltreatment on HRQoL was mediated by the biological or psychological developmental stage of the individual, with certain types of maltreatment resulting in differential effects over time. Although these data suggested that this phenomenon might exist, more research in this area is warranted, particularly surrounding the effects on HRQoL of different combinations of abuse

and other adverse outcomes experienced during childhood.

There were a number of other limitations with this study that should be considered. First, type of childhood maltreatment and other adverse exposures were defined by a limited number of survey questions. As such, there could exist wide exposure variance within each category that is not accounted for in the model. Second, the sample was not representative of the US population and included a group who had good health care coverage and access to health care. Thus, we cannot easily draw the conclusion that these utility losses would be higher or lower in other populations. However, we suspect that in populations with limited access to health care, and mental health services in particular, the marginal difference in utilities between cases and controls might be even greater. Third, we excluded respondents for whom complete SF-36 data (and therefore SF-6D data) were not available, and if these data were not missing at random, our results could be biased. To the best of our knowledge, there are no methods to impute missing values for the transformed SF-6D. Fourth, others have noted that traumatic events tend to be more memorable.[58,59] Therefore, adult self-reports of the neglect subtypes from the Adverse Childhood Experiences Study data may be less reliable than reports of the other maltreatment subtypes that are more traumatic.

Public Health Implications

Despite these limitations, translated over a typical lifespan of an individual (aged 75 years, for example), these data suggest that persons who experienced childhood maltreatment have a marginal decrease in at least 2 years of undiscounted quality-adjusted life expectancy, compared with persons who did not experience childhood maltreatment. A cost-effectiveness analysis of an intervention designed to prevent childhood maltreatment, therefore, would include 2 QALYs saved for every case of childhood maltreatment prevented. These results represent a floor effect of the true impact of childhood maltreatment on QALYs for 3 reasons. First, these estimates did not include losses in life years that may be associated with childhood maltreatment because of its influence on key risk factors for suicide and drug- or alcohol-related fatalities.[60,61] Our estimates of QALYs lost in a maltreated population also did not account for differential mortality rates associated with chronic diseases found to be correlated with childhood maltreatment. And, of potential greater impact, our estimates did not include HRQoL losses incurred during the acute stage of the maltreatment.

These utility loss estimates were also conservative in that other adverse childhood exposures were controlled for in the estimation of the propensity score, thus making the utility losses estimated in this analysis marginal to any utility losses that could occur with co-existing adverse childhood exposures. Dong et al.[48] found that the presence of 1 adverse childhood exposure resulted in significantly higher odds (between 2 and 17.7 times) of reporting additional adverse childhood exposures. As a reduction in SF-36 score by increasing number of self-reported adverse childhood exposures was shown in Edwards et al.,[32] we would expect utility losses to also increase with an increasing number of adverse childhood exposures. The marginal effect of the other adverse childhood exposures may be less influential then the effect of childhood maltreatment on utility, however. To test this, we estimated utility losses by ACE score and found that individuals with 5 or more adverse childhood exposures had a marginal utility difference of 0.067. Compared with individuals with zero adverse childhood exposures, an individual with 5 or more exposures would have a marginal decrease of at least 5 years (over his or her lifespan) of undiscounted quality-adjusted life expectancy.

The results presented here are an important first step for developing the benefits measure for use in economic evaluations. Economic evaluations are critical for policymakers charged with making allocation decisions with scarce public health resources. Use of a composite measure, such as the QALY, allows the decisionmaker to consider effects of the intervention on length of life and quality of life simultaneously. Applications of cost-effectiveness analyses to interventions that prevent childhood maltreatment are ideal because of the impact on life expectancy previously suggested by the literature and on quality of life as indicated by these results. If cost-effectiveness analyses of interventions to prevent childhood maltreatment are to be successful, further research to estimate the impact of childhood maltreatment severity and duration on quality of life and differential mortality losses associated with victims of childhood maltreatment are essential. This would require a serious commitment to collecting and analyzing longitudinal data on these victimized children. Improvements in HRQoL assessment of children, both in defining the dimensions of health appropriate for this age group and in improving elicitation methods, are also needed. When short-term losses in HRQoL are coupled with the long-term losses in HRQoL presented here, analysts will have a complete accounting of QALYs that could be saved per case of childhood maltreatment prevented. ■

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Contributors

P.S. Corso originated the study and supervised all aspects of its implementation, synthesized analyses, and led the writing. V.J. Edwards and X. Fang assisted with the study and completed the analyses. J.A. Mercy assisted with the synthesis of the analyses and the writing of the article. All authors helped to conceptualize ideas, interpret findings, and review and edit drafts of the article.

Human Participant Protection

No human participants were involved in this study.

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