

Maternal and Infant Characteristics in Abuse: A Case Control Study

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Eighty-six abused children identified by two Children's Aid Societies in Hamilton-Wentworth County, Ontario, were compared with 86 controls born in the same hospital. Three factors were significantly more common in the abused group: (1) low socioeconomic status of the mother, (2) younger age at time of delivery, and (3) indication of a psychosocial problem recorded in the medical chart. The failure to find significant differences between abused children and controls in birth-weight, Apgar score, and prematurity contrasts with earlier investigations of infant characteristics and child abuse.

Current trends in understanding the etiology of child abuse have moved from an investigation of the characteristics of the abusing parents toward a consideration of the role of the child.¹ Studies that have reviewed retrospectively the child's characteristics at birth have found that abused children tend to have lower birthweights²⁻⁴ and lower Apgar scores^{5,6} than the general population and are more likely to be premature.^{4,7} The associations between low birthweight, low Apgar, prematurity, and child abuse have been used by Friedrich and Boriskin¹ and Goldson et al⁵ to suggest that the presence of these factors in the newborn is a sufficient criterion for intervention. However, if intervention programs are to be implemented, the predictive value of the child's characteristics at birth needs to be examined further, particularly in light of recent criticism by Leventhal⁸ directed at

case-control studies on child abuse for failing to meet basic methodologic standards.

The objectives of this investigation are to replicate the findings of earlier retrospective studies that have reported an association between child abuse and the child's health at birth, and to examine the relationship between maternal prenatal history and subsequent child abuse.

Methods

Hamilton-Wentworth is an urban county in southern Ontario with a 1976 population of 529,375. The county has three hospitals with obstetrical and newborn services, all located in the city of Hamilton. In order to determine the relationship between factors related to pregnancy and delivery and subsequent child abuse, the prenatal and delivery records of mothers of abused children who delivered in the three Hamilton hospitals were compared with those of a control group. All

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cases of child abuse reported to Hamilton-Wentworth Child Abuse Registry from January 1977 to December 1979 involving children under the age of five years were identified for possible inclusion in the study. The two Children's Aid Societies that are legally responsible for maintaining the Child Abuse Registry in the county listed 126 cases divided into two categories of abuse: verified and suspected. Verified cases consisted of those families whose parents admitted to abuse or where enough evidence of physical abuse existed for the Children's Aid Society to seek a court conviction injunction. Suspected cases consisted of those families for which the level of suspicion was high but the physical evidence of abuse was less clear-cut. Both types of abuse were included in the study to broaden the spectrum of maltreatment being considered.

Delivery records were sought for all 126 biological mothers in the registry. The final sample consisted of 86 of those mothers found to have delivered in one of the three Hamilton hospitals. Of the 40 abuse cases not included in the study, 32 were excluded because the target child was born outside the Hamilton region, 5 cases contained insufficient data for location of the medical record, and 3 involved abuse occurring outside the home.

The 86 study cases consisted of 32 confirmed abuse cases and 54 suspected abuse cases. A control group was obtained by selecting the next live birth at the hospital in which each index case was born. Chart review of the medical records of cases and controls was completed by a research associate who was aware of group membership. Maternal and infant measures selected for review are listed in Table 1. Social class was divided into five levels as defined by the Hollingshead two-factor index.⁹ A pregnancy was considered of high risk if the attending physician checked the relevant box on a standardized prenatal form completed at the first visit. Although prenatal forms are standardized throughout the area under study, there are no standardized criteria for deciding on risk level.

Indication of a psychosocial problem was present when any negative psychosocial reference to the mother appeared on her chart. Comments stemming from Children's Aid Society intervention in the immediate prenatal period were included. The chi-square statistic with level of significance set at 5 percent was used to test differences between abused children and controls. To examine

the possibility that the inclusion of "suspected" abuse cases biased the relationship between maternal and infant characteristics and subsequent abuse, a second analysis was done identical to the first with the exception that only the 32 verified abuse cases and their controls were included. Because of the small numbers Fisher's exact test was used in this analysis.

Results

All abusing mothers were in the lowest two socioeconomic classes (21 percent level IV, and 79 percent level V) using data obtained from the Children's Aid Societies. However, using the medical record, the social class for only one half of the abusing and control group was recorded (Table 1), and 74 percent of the control group for whom data were available were in the two lowest classes.

There were three times as many abusing mothers under the age of 18 years at delivery as control mothers, although this difference was not statistically significant (Table 1). However, the mean ages (\pm SD) at delivery of abusing mothers (22.1 ± 4.55 years) and control mothers (25.1 ± 4.75) were significantly different ($t = 4.30$, 170 *df*, $P < .001$).

The only other maternal characteristic to differ significantly between the two groups was the indication of a psychosocial problem recorded in the medical chart (Table 1). Thirty percent (26/86) of abusing mothers compared with 6 percent (5/86) of controls had such comments written into the hospital progress notes. However, 50 percent of these comments (13/26) about abusing mothers and 40 percent of comments about controls stemmed from Children's Aid Society intervention during the prenatal period and thus were not based primarily upon observations by medical personnel.

No significant differences were observed between the two groups in infant characteristics (Table 1). Eleven percent of infants in each group weighed less than 2,500 g at birth. Moreover, the number of abused children transferred to the neonatal unit (19/86) was very close to the number of control children (17/86) requiring similar care.

The results of a second analysis using only the

Table 1. Maternal and Infant Data for Confirmed and Suspected Abuse Cases and Controls		
Measure	Abused Children No. (%)	Controls No. (%)
Maternal		
Social class IV, V	42/42 (100)	32/44 (74)*
Under 18 years of age at delivery	9/86 (11)	3/86 (4) NS
Indication of a psychosocial problem recorded on chart	26/86 (30)	5/86 (6)**
High-risk pregnancy	14/79 (18)	9/82 (11) NS
More than 7 days in hospital after delivery	19/86 (22)	15/86 (17) NS
Infant		
Birthweight <2,500 g	9/86 (11)	9/85 (11) NS
Gestational age < 37 weeks	8/86 (9)	4/86 (5) NS
Transferred to premature unit	19/86 (22)	17/86 (20) NS
Apgar score < 8 at 5 min	4/82 (5)	2/80 (2) NS
Note: Reduced sample size for some variables due to missing data in hospital records		
*P < .001		
**P < .0001		
NS: P > .05		

32 verified abuse cases and their controls were the same as the initial analysis except that indications of a psychosocial problem recorded on the medical chart (5/32 for abuse cases and 2/32 for controls) was no longer significantly different between the groups. There remained, however, significant differences in mean age and in social class between the two groups, with abusing mothers restricted to levels IV and V and controls distributed across all levels.

Discussion

The findings of this study suggest that the best predictors of child abuse from information routinely available on the medical record at birth are the socioeconomic status of the family, maternal age

at time of delivery, and indications of psychosocial problems recorded on the chart. These findings, however, must be viewed in light of four controversial issues.

First, information needed to determine the socioeconomic status of families was available on the medical chart for only one half of the cases and controls. More information on socioeconomic status was obtained by examining alternative data sources. Information on file with the Children's Aid Societies confirmed that the remaining abuse cases fell into classes IV and V. It was possible to get socioeconomic status from the medical record of 51 percent of control mothers, and of these a high proportion (74 percent) were also in class IV or V. This finding suggests that the recording of socioeconomic status may be biased toward recording the data for lower classes. If a downward bias does exist in the estimate of socioeconomic status among the control families, then the strength of association between socioeconomic

Table 2. Comparison of Selected Variables with Other Studies

Variable	Lynch & Roberts ⁷		Murphy et al ⁴		Present Study	
	Abuse No. (%)	Control No. (%)	Abuse No. (%)	Control No. (%)	Abuse No. (%)	Control No. (%)
First visit after 20 weeks' gestation	—	—	23/80 (29)	7/80 (9)*	14/73 (19)	15/74 (20)**
Gestational age less than 37 weeks	11/50 (22)	1/50 (2)*	11/80 (14)	1/80 (1)*	8/86 (9)	4/86 (5)**
Birthweight less than 2,500 g	—	—	16/80 (20)	7/80 (9)†	9/86 (10)	9/85 (11)**
Admitted to special care nursery	21/50 (42)	5/50 (10)‡	23/80 (29)	11/80 (14)†	19/86 (22)	17/86 (20)**
*P < .01						
**P > .05						
†P < .05						
‡P < .001						

status and child abuse may be *stronger* than observed.

Second, it is possible that the relationship between socioeconomic status and child abuse is due to the unequal detection and registry of cases by the Children's Aid Societies, resulting in the underrepresentation of higher social classes in the Child Abuse Registry. This criticism stems from the belief that child abuse and neglect are broadly distributed throughout society and unrelated to social class. While no evidence exists to support this belief, contrary evidence is prevalent and has been summarized by Pelton.¹⁰ The strongest contrary evidence is the persistent relationship between lower socioeconomic status and the most severe and least easily hidden form of maltreatment—child abuse resulting in death.^{11,12}

Third, since an association exists between maternal age and socioeconomic status (the study data yielded a modest, yet statistically significant Spearman correlation of $r = -.34$, $P = .001$), it is unclear which risk factor contributes most to subsequent abuse. The design of this study does not permit a definitive answer to this problem. Finally, the prediction of child abuse from psychosocial problems recorded in the chart is confounded by

the prenatal involvement of Children's Aid Societies with some families. The early involvement of a Children's Aid Society increases the susceptibility of these parents to being labeled and registered as child abusers in the postnatal period. Nevertheless, when comments originating from Children's Aid Societies are excluded, differences statistically significant at $P < .01$ persist between cases (13/73 or 18 percent) and controls (3/83 or 4 percent) in the number of families with indication of a psychosocial problem recorded on the chart. These indications varied from a simple observation that the mother seemed very anxious to a noted history of previous suicide attempts.

It is important to note that these observations fail to support the hypothesis that characteristics of the child at birth are significant predictors of later abuse. This finding is particularly interesting when compared with the results from recently published work of similar design and methodological standard (Table 2). The first explanation for these differences lies in the selection of cases and controls. Cases assembled for these types of studies are invariably incomplete, with case losses including those parents who abuse their children and go undetected. Moreover, controls selected ran-

domly (the first live child born after the index child in these studies) are sometimes inadequate for certain types of analyses, particularly where differences between cases and controls (eg, socioeconomic level) are confounded with other variables that might affect the development of abuse (eg, prematurity or the age of the mother). A second explanation focuses on "styles" of prenatal care. In Hamilton, for example, a high proportion of control mothers (20 percent) made their first prenatal visit after 20 weeks' gestation, and a high proportion of neonates in the control group (20 percent) were admitted to a special care nursery compared with controls in the British studies (Table 2). A third explanation involves prenatal care. Evidence exists that the availability and use of prenatal care enhances newborn health.¹³ It could be possible for increased prenatal care to attenuate the relationship between child health at birth and later abuse. Consistent with this hypothesis is that a major prospective study by Altemeier et al,¹⁴ which drew its sample from women already in attendance at prenatal clinics, did not find the child's characteristics at birth to be significant predictors of abuse.

The early identification of parents at risk to abuse draws its importance from the potential to avoid or to lessen future harm to generations of children. However, this is a controversial issue. Incorrectly labeling parents as being at risk to abuse may bring about the very behavior to be avoided. Moreover, short of removing the child from the family, very little is known about efficacy of interventions designed to prevent harm to children of parents truly at risk to abuse.

Contrary to earlier reports, information routinely collected and available in the medical record at birth is insufficient to predict subsequent child abuse, at least in Hamilton-Wentworth County, Ontario, and should not be used as the basis for screening parenting potential. The methodological weaknesses and conflicting results of retrospective studies of child abuse suggest the need for a prospective survey of parenting problems. With this need in mind, a cohort of pregnant women has been identified for systematic assessment in the prenatal period and follow-up to 18 months after delivery. The intent of the study is to test the strength of association between clusters of factors measured prenatally and indicators of parenting observed in the postnatal period.

The long-term hope is that a simple instrument which is more specific than present methods can be developed for use by family physicians to predict during pregnancy potential parenting problems. While it is important to detect potentially abusing parents, it is also essential to avoid mislabeling those who are not.

Acknowledgments

This work was supported by a grant from the Ontario Ministry of Community and Social Services, Child Abuse Program. The authors express their appreciation for cooperation given by Dr. J. Byles, the Hamilton Children's Aid Society, the Catholic Children's Aid Society, and the staff at the Chedoke-McMaster, St. Joseph's, and Henderson Hospitals in Hamilton, Ontario.

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