Predicting Childhood Sexual or Physical Abuse: A Logistic Regression Geo-mapping Approach to Prevention

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Abstract. This study investigates the degree to which gender, ethnicity, relationship to perpetrator, and geo-mapped socio-economic factors significantly predict the incidence of childhood sexual abuse, physical abuse and non- abuse. These variables are then linked to geographic identifiers using geographic information system (GIS) technology to develop a geo-mapping framework for child sexual and physical abuse prevention.

Background. Serious cases of abuse are increasingly reported every year, making child sexual abuse (CSA) and child physical abuse (CPA) a complex societal problem. The Third National Incidence of Child Abuse and Neglect (NIS-3) reported a sharp increase in the problem of childhood abuse and neglect. An estimated 1,553,800 children in the United States were abused or neglected under the Harm Standard in 1993. Between 1986 and 1993, the total estimated number of abused and neglected children in the United States who fit the Endangerment Standard nearly doubled: in 1986, there were an estimated 1,424,400 abused and neglected children in the United States[1]. Furthermore, the American Medical Association declared sexual assault "a silent violent epidemic", the center for disease control (CDC) and prevention and the World Health Organization have declared violence prevention a public health priority.

Method.

Participants. Social workers obtained gender, ethnicity, relationship to perpetrator, type of abuse/non-abuse, and zip code data retrospectively from the chart records of 936 children who were patients in a pediatric hospital emergency room between January and October of 2004. The qualifying factor for inclusion in the sample was referral to child protective services (CPS) and/or social workers for alleged sexual abuse, physical abuse or non-abuse with serious injuries. All data collected were deidentified, and protected in an encrypted computer media.

Analysis. Relationships among gender, ethnicity, relationship to perpetrator, geo-mapped socio-economic factors and incidence of sexual, physical abuse and non-abuse are investigated. The data obtained from the chart records is geo-coded to income, family size, and population density data from ArcView 9.0® which uses U.S. census data coded to longitude and latitude and generates aggregated GIS maps. GIS allows visual representation and systematic analyses of data to support public health initiatives[2].

Two binary logistic regression analyses using SPSS V.13® are then implemented to determine and model the degree to which gender, ethnicity, relationship to perpetrator, geo-mapped income, family size and population density significantly predict the incidence of: (1) child sexual abuse or non abuse, (2) child physical abuse or non abuse. Odds ratios identify relative risks for each significant predictor in the logistic regression equations.

Discussion. Results model how data collected at the point of care can be geo-mapped through the use of GIS technology to socio-economic risk factors associated with localities to predict incidence of childhood sexual and physical abuse. The maps created then can provide child protective services and community-based agencies a visual tool to help identify neighborhoods in which children may be at high risk for childhood sexual or physical abuse, and to target prevention programs.

References

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