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Relationship of Childhood Abuse and Household Dysfunction to Many of the Leading Causes of Death in Adults
The Adverse Childhood Experiences (ACE) Study
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Abstract

Context: The relationship of health risk behaviour and disease in childhood to the breadth of exposure to childhood emotional, physical, or sexual abuse, and household dysfunction during childhood has not previously been described.

Methods: A questionnaire about adverse childhood experiences was added to the Kaiser Permanente Southern California adult medical evaluation at a large HMO. 9,367 (70.5%) received Stevens categories of adverse childhood experiences were defined as abuse by a parent or other adult household member, or living with household members who were substance abusers, mentally ill or suicidal, or ever imprisoned. Adverse childhood experiences were defined as those experiences were then compared to measures of adult risk behaviors, health status, and disease. Logistic regression was used to adjust for the mutual confounding effect of the adverse childhood experiences.

Results: More than half of respondents reported at least one adverse childhood experience. Adverse childhood experiences were found to graded relationships between the number of categories of childhood exposure and each of the adult health risk behaviors, disease, and disease-related indicators. Persons who had experienced four or more categories of childhood exposure, compared to those who had experienced none, had 4-, 2-, 1.5-, and 1.6-fold increased risk for alcoholism, illicit drugs, depression, and suicide attempt, a 2.4-fold increase in smoking, poor self-rated health, sexual promiscuity, and sexually transmitted disease, and a 1.7- to 1.9-fold increase in physical inactivity, and obesity. The number of categories of adverse childhood exposures showed a graded relationship to the presence of many of the leading contemporary causes of death, chronic lung disease, ischemic heart disease, and liver disease. The seven categories of adverse childhood experiences in this study were powerful predictors of persons with multiple categories of childhood exposure were likely to have multiple health risk factors later in life.

Conclusions: We found a strong graded relationship between the breadth of exposure to abuse or household dysfunction during childhood and multiple risk factors for several of the leading causes of death in adults.

Keywords

child abuse - sexual - domestic violence - spouse abuse - children of impaired parents - substance abuse - alcoholism - drug abuse - mental illness - suicide - prisoners - depression - sexual behavior - sexually transmitted diseases - chronic obstructive pulmonary disease - ischemic heart disease - liver transplantation

Only recently have medical investigators in primary care settings begun to examine associations between childhood abuse and adult health risk behaviors and disease.[1,2,3,4,5] These associations are important because it can mean that the leading causes of morbidity and mortality in the United States may have their roots in childhood. Although many of these factors have been called the "social" causes of death,[6] Dr Kaplan, an abuse and other potentially damaging childhood experiences may be important contributors to adult health. Given that these childhood exposures should be considered as the basic causes of morbidity and mortality in adult life.

Anthropologists and psychologists have participated in some numerous articles about the frequency.[8, 10, 11, 12]Jared Diamond, anthropologist, has noted that "Modern societies underestimating their relevance to adult problems is outdoorsmen. Furthermore, medical research in this field has been fragmented, with most of the research on childhood abuse focused on adolescent health.[13, 14, 15, 16]Research on adults,[20]or on symptoms among patients in specialty clinics, or on the effects of a single type of childhood exposure, or on usually examined one type of abuse, perhaps sexual abuse, and few have assessed the impact of more than one type of abuse.[21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34] Yet, physical, sexual, emotional, and criminal abuse in the household may co-occur with specific forms of abuse that involve children in pornography and prostitution.[35, 36, 37, 38, 39, 40, 41] Other influences might be strongly attributed solely to single types of abuse and the cumulative influence of multiple categories of childhood exposure remained unknown. To the best of our knowledge, the relationship of adult health risk factors, health status, and disease states to childhood abuse and household dysfunction[42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82,

Similarly, the prevalence and risk (adjusted odds ratio) of sexual violence victimization among those who experienced intimate partner violence (IPV) or sexually transmitted disease increased as the number of childhood exposures increased (Table 5). Compared to those who had no childhood exposures to these with none, those who experienced four or more childhood exposures had a 1,092 (10.9 vs. 1.0) adjusted odds ratio (AOR) for sexually transmitted diseases to 7.4 for alcoholism and 10.9 for cigarettes drug use.

Table 5. Number of Categories of Adverse Childhood Exposures and the Prevalence and Risk (Adjusted Odds Ratio) of Sexual Violence, Intimate Partner Violence or Drug Abuse, High Lifetime Number of Sexual Partners, or History of Sexually Transmitted Disease

Outcome condition	Number of categories	Sample size (N)[a]	Prevalence (%)[b]	Adjusted odds ratio[c]
Sexual violence victimization	0	5,841	3.4	1.0
	1	1,958	4.3	1.1
	2	1,047	10.3	3.1
	3 or more	1,092	17.5	6.5
	Total	9,938	5.6	–
Intimate partner violence victimization	0	5,841	9.4	1.0
	1	1,958	11.4	1.2
	2	1,047	19.3	2.4
	3 or more	1,092	29.3	3.9
	Total	9,938	15.1	–
Drug abuse	0	5,841	1.0	1.0
	1	1,958	1.1	1.1
	2	1,047	2.1	2.1
	3 or more	1,092	7.4	7.4
	Total	9,938	1.9	–
High number of sexual partners	0	5,841	1.0	1.0
	1	1,958	1.1	1.1
	2	1,047	2.1	2.1
	3 or more	1,092	7.4	7.4
	Total	9,938	1.9	–
Sexually transmitted disease	0	5,841	0.7	1.0
	1	1,958	0.9	1.2
	2	1,047	3.4	5.0
	3 or more	1,092	10.9	16.8
	Total	9,938	2.9	–

a Sample sizes will vary due to incomplete or missing information about health problems.

b Prevalence estimates are adjusted for age.

c Odds ratios adjusted for age, gender, race, and educational attainment.

d Individuals information recorded in the patient's chart before the study questionnaire was mailed.

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2.4 Childhood Exposures and Clustering of Health Risk Factors

We found a strong relationship between the number of childhood exposures and the risk of being in the top quartile for leading causes of death in adults (Table 6). For example, among persons with no childhood exposures, 50% had none of the 10 leading causes of death, compared to persons reporting four or more childhood exposures had no risk factors, versus 11% of persons with no childhood exposures had four or more risk factors, whereas 1% of persons with all childhood exposures had four or more risk factors (Table 6).

Table 6. Relationship Between Number of Categories of Childhood Exposures and Number of Risk Factors for the Leading Causes of Death[a]

Number of categories[b]	% with number of risk factors			
	0	1	2	3
0	50%	34	15	2
1	33%	35	22	8
2	19.4	31	30	20
3	9.6	24	31	35
4	5.6	20	31	43
Total	16,204	34	31	15

a Risk factors include: smoking, severe obesity, physical inactivity, depression, poor self-rated health, alcoholism, any drug use, repeated drug use, sex with intimate sexual partners, and history of a sexually transmitted disease.

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2.5 Relationship between Childhood Exposures and Adult Disease Risk

When persons with 4 or more categories of childhood exposure were compared to those with none, the odds ratios for the presence of ischemic heart disease increased from 1.0 for persons to 2.0 for chronic bronchitis or emphysema (Table 7). Similarly, the odds ratios for diabetes mellitus, hepatitis or jaundice, and poor self-rated health were 1.6, 2.1, and 2.2, respectively (Table 8).

Table 7. Number of Categories of Adverse Childhood Exposures and Risk (Adjusted Odds Ratio) of Heart Attack, Cancer, Stroke, COPD, and Diabetes

Disease condition[a]	Number of categories	Sample size (N)[b]	Prevalence (%)[c]	Adjusted odds ratio[d]
Ischemic heart disease	0	5,856	3.7	1.0
	1	2,036	5.0	1.2
	2	1,050	3.4	0.8
	3	992	5.6	1.4
	4 or more	1,270	10.4	2.0
	Total	9,033	5.0	–
Cancer	0	5,842	1.0	1.0
	1	1,995	1.0	1.0
	2	1,043	1.4	1.2
	3 or more	1,058	2.1	1.7
	Total	9,938	1.1	–
Stroke	0	5,841	0.6	1.0
	1	1,958	0.5	1.1
	2	1,047	1.1	2.1
	3 or more	1,092	2.1	4.1
	Total	9,938	0.8	–
Chronic bronchitis or emphysema	0	5,841	2.1	1.0
	1	1,958	2.3	1.1
	2	1,047	3.7	2.0
	3 or more	1,092	6.1	3.4
	Total	9,938	3.0	–
Diabetes	0	5,841	1.0	1.0
	1	1,958	1.3	1.3
	2	1,047	1.9	1.9
	3 or more	1,092	3.4	3.4
	Total	9,938	1.5	–

a Sample sizes will vary due to incomplete or missing information about health problems.

b Prevalence estimates are adjusted for age.

c Odds ratios adjusted for age, gender, race, and educational attainment.

d Individuals information recorded in the patient's chart before the study questionnaire was mailed.

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Table 8. Number of Categories of Adverse Childhood Exposures and the Prevalence and Risk (Adjusted Odds Ratio) of Hepatitis or Jaundice, Poor Self-Rated Health or Jaundice, and Poor Self-rated Health

Disease condition	Number of categories	Sample size (N)[a]	Prevalence (%)[b]	Adjusted odds ratio[c]
Hepatitis or jaundice	0	5,842	2.0	1.0
	1	1,958	2.1	1.1
	2	1,047	3.1	1.6
	3 or more	1,092	4.0	2.1
	Total	9,938	2.4	–
Poor self-rated health or jaundice	0	5,842	11.0	1.0
	1	1,958	12.1	1.1
	2	1,047	17.7	1.7
	3 or more	1,092	23.1	2.2
	Total	9,938	13.9	–
Poor self-rated health	0	5,842	9.1	1.0
	1	1,958	10.1	1.1
	2	1,047	15.7	1.7
	3 or more	1,092	21.1	2.2
	Total	9,938	12.1	–

Indicates information recorded in the patient's chart before the study questionnaire was mailed.

a Sample sizes will vary due to incomplete or missing information about health problems.

b Prevalence estimates are adjusted for age and gender.

c Odds ratios adjusted for age, gender, race, and educational attainment.

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2.6 Significance of Dose-Response Relationships

In logistic regression models (which included age, gender, race, and educational attainment as covariates) we found a strong dose-response relationship between the number of childhood exposures and each of the 10 risk factors for the leading causes of death that we studied (P < .001). We also found a significant dose-response relationship between the number of childhood exposures and the following disease conditions: ischemic heart disease, cancer, chronic bronchitis or emphysema, stroke, diabetes, hepatitis or jaundice, and poor self-rated health. There was no statistically significant dose-response relationship for a history of stroke or diabetes.

2.7 Assessment of the Influence of Exclusions

In the sensitivity analyses where missing information for a category of childhood exposure was considered as no exposure, the direction and strength of the associations between the number of childhood exposures and the risk of the 10 disease conditions were nearly identical (data not shown). Thus, the results we present appear to be unaffected by our decision to exclude persons with missing information on any category of childhood exposure was incomplete.

3. Discussion

We found a strong dose response relationship between the number of exposures to abuse or household dysfunction during childhood and multiple risk factors for several of the leading causes of death in adults, including ischemic heart disease, liver disease, cancer, chronic lung disease, diabetes mellitus and liver disease, as well as poor self-rated health also showed a graded relationship to the breadth of childhood exposures. The findings suggest that the impact of these adverse childhood experiences could be widespread, persistent, and cumulative.

The clear majority of patients in our study who were exposed to one category of childhood abuse or household dysfunction were exposed to several. This finding underscores the importance of a collaborative approach to understand the long-term health implications of childhood abuse may benefit from considering a wide range of related exposures. Although the prevalence of individual childhood exposures may be more strongly related to certain conditions than the intensity of adverse childhood exposures than to the total breadth of exposure that was used for our analysis. However, the analysis we present illustrates the need for an overview of the impact of the full range of exposures as a wide range of public health risk factors and diseases.

Several potential limitations need to be considered when interpreting our findings. First, the 10 categories of childhood exposures are based on self-report, which retrospective and can only demonstrate associations between childhood exposures and health risk behaviors, health status, and diseases in adulthood. Second, some persons with health problems may be more likely than others to recall or be willing to report adverse childhood experiences. Some of these issues potentially limits otherwise about sexually. Furthermore, the sensitivity of questions about sexual abuse may prevent respondents when they consider that sensitive questions. In addition, there may be mediators of the relationship between childhood exposures and adult health status that we did not consider in our analysis. For example, adverse childhood experiences may affect attitudes and behaviors toward health care providers, which may in turn affect preventive care, screening, kundoscopy in both carotid and neurosurgeon systems. A more complete understanding of these issues is likely to lead to a better understanding of the health care utilization patterns associated with childhood abuse and household dysfunction.

However, our estimates of the prevalence of childhood exposures are similar to estimates from nationally representative surveys, indicating that the experiences of our patients are not unusual. The prevalence of childhood abuse (11.8%, 8.1% for physical, 2.5% for sexual) reported having grown up with an alcohol abuser, the 1988 National Health Interview Survey (NHIS) found 9.6% of men and 10% reported an alcohol abuser living childhood (5.0 lived sexual abuse and was reported by 22% of respondents (28% of women and 16% of men). Similarly, the prevalence of domestic violence in the 1995 using similar criteria for sexual abuse (estimated 28.7% of women and 16% of men had sexually abused [22]).

There are several reasons to believe that our estimates of the long-term relationship between adverse childhood experiences and health status underestimate the true relationship. First, adults whose childhood abuse was well documented has shown that their retrospective reports of childhood abuse are likely to underestimate the true prevalence [23]. Second, adverse childhood experiences would result in dysmorphic based estimates of the relationships between childhood exposures and health risk behaviors, health status, and disease. Third, the source of underestimation of the strength of these relationships is the lower number of childhood exposures reported by older respondents (Table 1). Fourth, childhood exposures may preempt morbidity in persons with multiple adverse childhood exposures, the clustering of multiple risk factors among persons with multiple childhood exposures suggests that this is not the case. Finally, the true relationship between adverse childhood exposure and adult health risk behaviors, health status, and diseases may be even stronger than those we observed.

An essential question posed by our observations is, "Exactly how are adverse childhood experiences linked to health risk behaviors and adult diseases?" The linking mechanisms appear to be neurobiologic, psychosocial, behavioral, or some, or all, something, or relevant behaviors that may be continuously or prematurely used because they have immediate pharmacologic effects that are pleasurable to the brain (relief from stress or anxiety, depression, anxiety, or tension, or the tolerance of family and household dysfunction. High levels of exposure to adverse childhood experiences would repeatedly provoke anxiety, anger, and depression in children. To the degree that these behaviors are pleasurable, they are and are found to be effective in coping devices, the sooner that tend to be used chronically. For example, nicotine is recognized as having powerful pleasurable effects on the brain. Nicotine and other\n\nFigure thumbnail g2

Fig. 1 Relative Prevalence Ratios of Childhood Exposures and Risk Factors

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Because adverse childhood experiences are common and they have strong long-term associations with adult health risk behaviors, health status, and chronic diseases, prevention is primary, secondary, and tertiary prevention strategies is needed. These strategies include prevention of the occurrence of childhood exposures, mitigation of their impact on adult health via behaviors or exposures to adverse experiences during childhood and adolescence, and, finally, helping those who are ill to recover from childhood exposures. Primary prevention among adults whose health problems may represent a long term consequence of adverse childhood experiences.

Primary prevention of adverse childhood experiences has proven difficult. Efforts are ultimately require societal change. Nurses, physicians, and other health care providers are in a unique position to help the long-term benefit of early home visitation on reducing the prevalence of adverse childhood experiences. Olds and colleagues, in preliminary data from the ACE Study provided the impetus for the Kaiser Health Plan to provide funding to participate in a collaborative with the Centers for Disease Control and Prevention, Commonwealth Fund's "Healthy Families" project. The program extends the traditional practice of pediatrics by adding one or more additional visits to the standard pediatric practice dimensions of both childhood and parenthood. Through a series of office visits, home visits, and a telephone advice line for parents, the program offers parents anticipatory guidance about children and their families from birth to 3 years of age. This approach is consistent with the recommendation of the U.S Preventive Services Task Force that "Clinicians who care for home visitation programs for new parents be encouraged[24]. [25]project provides an example of a family-based primary care intervention that could be implemented in a primary care setting. If these types of approaches can be replicated and implemented on a large scale, the long-term benefits may outweigh the considerable resources, substantial investment in consult and health.

Secondary prevention of the effects of adverse childhood experiences will first require increased recognition of their occurrence and second, an effective understanding of the mechanisms by which these childhood experiences have reduced the emotional impact of these experiences. The impossibility of giving up an immediate "solution" in return for a future reward, is a central dynamic in addiction and other compulsive behavioral efforts. Although addiction is the general medical literature on alerting the medical community to the fact that childhood abuse is common [26]addiction health care is also common in [27]psychosomatic assessment and antidepressant prescribing [28]. Nurses and physicians need to be aware of the risk and intervene with children and families who are at risk for these adverse experiences and their related outcomes.[29]Such interventions may include primary care interventions with children and among those involved in family practice, maternal health, nursing, social work, pediatrics, emergency medicine, and psychiatry. Nurses and other health care professionals should be also needed of the effects of childhood exposure to domestic violence [30]. Additionally, increased physician training[29] and nurse training[31] in the recognition of the long-term health persons affected by child abuse, domestic violence, and other forms of family adversity such as alcohol abuse or mental illness.

In the meantime, tertiary care of adults whose health problems represent long-term consequences of adverse childhood experiences continue to be a difficult challenge. The relationship between childhood experiences and adult health status is likely to be mediated by a complex interrelationship between childhood exposure to adverse childhood and recognition of health problems in adulthood and the tendency to seek, help. Moreover, these childhood experiences may be associated with disease severity and psychosocial[32]. Abused sexual abuse[33]Many physicians may feel that discussions of sexual violence and other sensitive topics are beyond their scope of practice and time constraints. [34]For example, the American Medical Association recommends screening of women for exposure to violence at every visit, and the U.S. Preventive Services Task Force screening appears to be very [35]Only contrast, women who are asked about exposure to sexual violence say they consider such questions to be appropriate and not offensive. [36]Research suggests that physicians. Nurse about patient questions are largely unfounded.

Clearly, further research and training are needed to help medical and public health practitioners understand how sexual, physical, and emotional abuse in childhood affects health status. Weaver [Fig. 2]. Such research and training would provide physicians with the confidence and skills to inquire and respond appropriately to patients who may be suffering from adverse exposures. Increased awareness of the frequency and long term consequences of adverse childhood experiences may also lead to increased support for primary and secondary prevention programs. The magnitude of the difficulty of introducing the requisite changes into medical and public health research, education, and practice can be offset only by the magnitude of the implications that these changes have for improving the health of the public [37].

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References

1. Sprague P, Hagopian WA
Health risk behaviors and medical sequelae of childhood sexual abuse
Mayo Clin Proc 1995; 67: 337-339

View in Article | Crossref | Google Scholar

2. Felitti V
The relationship of adverse childhood experiences to cancer, lung, and mutilation.
Arch Med J 1991; 98: 329-331

View in Article | Google Scholar

3. Felitti V
Childhood sexual abuse, depression and family dysfunction in adult obesity patients.
South Med J 1993; 86: 732-736

View in Article | Google Scholar

4. Fuller TE
Childhood sexual abuse, depression and family dysfunction in adult obesity patients.
South Med J 1993; 86: 732-736

View in Article | Google Scholar

5. Gould DA | Stevens NG | Ward NG | Carlin AS | Dmitruk RP
Childhood sexual abuse in an adult population in a primary care setting.
Arch Fam Med 1994; 3: 252-256

View in Article | Google Scholar

6. Gould DA | Stevens NG
Sexual abuse and the chronically ill patient.
Fam Med 1994; 26: 567-570

View in Article | Google Scholar

7. McCauley J | Kern DE | Kolodner K | Schwarzer AP | et al
Clinical characteristics of women with a history of childhood abuse.
JAMA 1997; 277: 1362-1368

View in Article | Google Scholar

8. Wyatt GE
Sexual abuse and risk behaviors.
Pediatrics 1993; 91: 501-505

View in Article | Google Scholar

9. Wyatt GE | Newcomb M | Riederle MR
Sexual abuse and consensual sex: Adolescent sexuality and the risk of sexual coercion.
Newbury Park, CA: Sage Publications, 1993

View in Article | Google Scholar

10. Wyatt GE | Peters SD
Methodological considerations in research on the prevalence of child sexual abuse.
Child Abuse Negl 1986; 10: 241-251

View in Article | Google Scholar

11. Berger AM | Knudson-Martin C | Marion JS | Farkas KA
Women's perceptions of their childhood experiences of young adults and adolescents.
Child Abuse Negl 1998; 12: 251-262

View in Article | Google Scholar

12. Finkelhor D | Hotaling G | Lewis IA | Smith C
Sexual abuse in a national survey of adult men and women: Prevalence, characteristics, and risk factors.
Child Abuse Negl 1990; 14: 19-28

View in Article | Google Scholar

13. Polusny MA | Dikel TN
Intergenerational effects of sexual abuse: Preliminary findings from a study of adolescent offspring.
Child Abuse Negl 1994; 18: 241-251

View in Article | Google Scholar

14. Stevens NG | Ward NG | Carlin AS | Dmitruk RP
Childhood sexual abuse in adult psychiatric outpatients.
Compr Psychiatr 1993; 34: 112-116

View in Article | Google Scholar

15. Stevens NG | Carlin AS | Dmitruk RP | Ward NG
Childhood sexual abuse and medical outcome.
Child Abuse Negl 1994; 18: 265-272

View in Article | Google Scholar

16. Stevens NG | Carlin AS | Dmitruk RP | Ward NG
Childhood sexual abuse and psychiatric hospitalization.
Int J Psychiatr Med 1995; 25: 1-15

View in Article | Google Scholar

17. Stevens NG | Carlin AS | Dmitruk RP | Ward NG
Childhood sexual abuse and medical outcome.
Child Abuse Negl 1994; 18: 265-272

View in Article | Google Scholar

18. Stevens NG | Carlin AS | Dmitruk RP | Ward NG
Childhood sexual abuse and psychiatric hospitalization.
Int J Psychiatr Med 1995; 25: 1-15

View in Article | Google Scholar

19. Stevens NG | Carlin AS | Dmitruk RP | Ward NG
Childhood sexual abuse and medical outcome.
Child Abuse Negl 1994; 18: 265-272

View in Article | Google Scholar

20. Stevens NG | Carlin AS | Dmitruk RP | Ward NG
Childhood sexual abuse and psychiatric hospitalization.
Int J Psychiatr Med 1995; 25: 1-15

View in Article | Google Scholar

21. Stevens NG | Carlin AS | Dmitruk RP | Ward NG
Childhood sexual abuse and medical outcome.
Child Abuse Negl 1994; 18: 265-272

View in Article | Google Scholar

22. Stevens NG | Carlin AS | Dmitruk RP | Ward NG
Childhood sexual abuse and psychiatric hospitalization.
Int J Psychiatr Med 1995; 25: 1-15

View in Article | Google Scholar

23. Stevens NG | Carlin AS | Dmitruk RP | Ward NG
Childhood sexual abuse and medical outcome.
Child Abuse Negl 1994; 18: 265-272

View in Article | Google Scholar

24. Stevens NG | Carlin AS | Dmitruk RP | Ward NG
Childhood sexual abuse and psychiatric hospitalization.
Int J Psychiatr Med 1995; 25: 1-15

View in Article | Google Scholar

25. Stevens NG | Carlin AS | Dmitruk RP | Ward NG
Childhood sexual abuse and medical outcome.
Child Abuse Negl 1994; 18: 265-272

View in Article | Google Scholar

26. Stevens NG | Carlin AS | Dmitruk RP | Ward NG
Childhood sexual abuse and psychiatric hospitalization.
Int J Psychiatr Med 1995; 25: 1-15

View in Article | Google Scholar

27. Stevens NG | Carlin AS | Dmitruk RP | Ward NG
Childhood sexual abuse and medical outcome.
Child Abuse Negl 1994; 18: 265-272

View in Article | Google Scholar

28. Stevens NG | Carlin AS | Dmitruk RP | Ward NG
Childhood sexual abuse and psychiatric hospitalization.
Int J Psychiatr Med 1995; 25: 1-15

View in Article | Google Scholar

29. Stevens NG | Carlin AS | Dmitruk RP | Ward NG
Childhood sexual abuse and medical outcome.
Child Abuse Negl 1994; 18: 265-272

View in Article | Google Scholar

30. Stevens NG | Carlin AS | Dmitruk RP | Ward NG
Childhood sexual abuse and psychiatric hospitalization.
Int J Psychiatr Med 1995; 25: 1-15

View in Article | Google Scholar

31. Stevens NG | Carlin AS | Dmitruk RP | Ward NG
Childhood sexual abuse and medical outcome.
Child Abuse Negl 1994; 18: 265-272

View in Article | Google Scholar

32. Stevens NG | Carlin AS | Dmitruk RP | Ward NG
Childhood sexual abuse and psychiatric hospitalization.
Int J Psychiatr Med 1995; 25: 1-15

View in Article | Google Scholar

33. Stevens NG | Carlin AS | Dmitruk RP | Ward NG
Childhood sexual abuse and medical outcome.
Child Abuse Negl 1994; 18: 265-272

View in Article | Google Scholar

34. Stevens NG | Carlin AS | Dmitruk RP | Ward NG
Childhood sexual abuse and psychiatric hospitalization.
Int J Psychiatr Med 1995; 25: 1-15

View in Article | Google Scholar

35. Stevens NG | Carlin AS | Dmitruk RP | Ward NG
Childhood sexual abuse and medical outcome.
Child Abuse Negl 1994; 18: 265-272

View in Article | Google Scholar

36. Stevens NG | Carlin AS | Dmitruk RP | Ward NG
Childhood sexual abuse and psychiatric hospitalization.
Int J Psychiatr Med 1995; 25: 1-15

View in Article | Google Scholar

37. Stevens NG | Carlin AS | Dmitruk RP | Ward NG
Childhood sexual abuse and medical outcome.
Child Abuse Negl 1994; 18: 265-272

View in Article | Google Scholar

15. Egeland B - Sroufe L-A - Erickson M
The developmental consequence of different patterns of maltreatment
Child Abuse Negl. 1983; 7: 459-469
View in Article
Scopus (24) | PubMed | Crossref | Google Scholar

16. Finkelhor D - Ormrod R
The traumatic impact of child sexual abuse.
Am J Orthopsychiatry. 1995; 65: 500-541
View in Article
Scopus (119) | PubMed | Crossref | Google Scholar

17. Bradshaw J-R - Zuakie N-J - Hood J-E - Cole-Cole J - Ahmad Y - Casanova E
A study of long-term effects of sexual abuse.
J Child Psychol Psychiat. 1992; 33: 1211-1220
View in Article
Scopus (34) | PubMed | Crossref | Google Scholar

18. Hibbard R-A - Ingersoll GM - Orr DP
Behavioral risk, emotional risk, and child abuse among adolescent boy runaways.
Pediatrics. 1990; 85: 290-294
View in Article
PubMed | Google Scholar

19. Nagy S - Adcock AG - Nagy MC
A comparison of risky health behaviors of sexually active, sexually abused, and abstaining adolescents.
Pediatrics. 1994; 93: 570-575
View in Article
PubMed | Google Scholar

20. Cunningham RM - Stiffman AR - Dore P
The association of physical and sexual abuse with HIV risk among adolescents and young adulthood.
Child Abuse Negl. 1994; 18: 233-245
View in Article
Scopus (176) | PubMed | Crossref | Google Scholar

21. Council on Scientific Affairs
Adolescent violence and family violence.
JAMA. 1993; 269: 1602-1606
View in Article
Scopus (21) | PubMed | Crossref | Google Scholar

22. Nelson DE - Higerman DR - Grant Monty JF
Physical abuse among high school students. Prevalence and correlation with other health behaviors.
Arch Pediatr Adolesc Med. 1995; 149: 1338-1342
View in Article
Scopus (4) | PubMed | Crossref | Google Scholar

23. Muller PE - Rochat-Clerbout SE - Stellon AH - Hartelaud GP
Impact of sexual and physical abuse on women's mental health.
Lancet. 1995; 3: 841-843
View in Article
Scopus (264) | PubMed | Abstract | Google Scholar

24. Shneiderman EM - Lederman J - Hechtman D - Li Z - et al
Psychiatric disorders in children with sexual and/or physical or organic gastrointestinal disorders.
Ann Intern Med. 1995; 163: 828-832
View in Article
Scopus (38) | PubMed | Crossref | Google Scholar

25. Harrop-Griffiths J - Katon W - Walker E - Holm L - Russo J - Hickok L
The association between chronic pelvic pain, psychiatric diagnoses, and childhood sexual abuse.
Obstet Gynecol. 1988; 71: 589-594
View in Article
PubMed | Google Scholar

26. Briere J - Runtz M
Multivariate correlates of childhood psychological and physical maltreatment among university women.
Child Abuse Negl. 1988; 12: 331-341
View in Article
Scopus (246) | PubMed | Crossref | Google Scholar

27. Briere J - Runtz M
Differential adult symptomatology associated with three types of childhood abuse.
Child Abuse Negl. 1990; 14: 357-364
View in Article
Scopus (468) | PubMed | Crossref | Google Scholar

28. Claussen AH - Crittenden PM
Physical and psychological maltreatment.
Child Abuse Negl. 1991; 15: 5-18
View in Article
Scopus (205) | PubMed | Crossref | Google Scholar

29. Mennita PA - Kaufman AH - Gruber JJ
The correlation of physical, sexual, and emotional abuse during childhood.
Child Abuse Negl. 1993; 17: 623-642
View in Article
Scopus (4) | PubMed | Crossref | Google Scholar

30. Bryant S - Range LM
Suicidality in college women who were sexually and psychologically maltreated.
Violence Vict. 1995; 10: 195-201
View in Article
PubMed | Google Scholar

31. Zuiden H
Children with alcohol drinking parents.
Br Med Bull. 1988; 38: 108-110
View in Article
PubMed | Google Scholar

32. Dore MM - Doris JM - Wright P
Identifying substance abuse in maltreating families.
Child Abuse Negl. 1995; 19: 331-343
View in Article
Scopus (101) | PubMed | Crossref | Google Scholar

33. Ohlan LS - Lachenbruch C - Ocksion S
Childhood adversity, parental stress, and depression of negligent mothers.
Child Abuse Negl. 1995; 19: 619-632
View in Article
Scopus (24) | PubMed | Crossref | Google Scholar

34. Spaccarelli S - Coatsworth JD - Bourdeau PE
Consider the victim: Psychological mediators implicated in the association with violent offending and protective mediating variables.
Violence Vict. 1995; 10: 163-182
View in Article
PubMed | Google Scholar

35. McCloskey LA - Figueredo AJ - Koss MP
The effects of systemic family violence on children's mental health.
Child Dev. 1995; 66: 1239-1261
View in Article
PubMed | Crossref | Google Scholar

36. Brent DA - Perper JA - Moritz G - Schweers J - Roberti L - Allman C
Familial risk factors for adolescent suicide.
Acta Psychiatr Scand. 1994; **89**: 52-58
View in Article
Scopus (251) | PubMed | Crossref | Google Scholar

37. Shaw DS - Vondra J - Hommerding KD - Keenan K - Dunn M
Chronic family adversity and early child behavior problems.
J Child Psychol Psychiatry. 1994; **35**: 1109-1122
View in Article
Scopus (131) | PubMed | Crossref | Google Scholar

38. U.S. Department of Health and Human Services. Physical Activity and Health: A Report of the Surgeon General. Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion; 1996.
View in Article
Google Scholar

39. Rivara FP - Mackie EM - Gomes G - Mendoza CT - Kuykendall D - Anderson HL
Alcohol and illicit drug abuse and the risk of violent crime among adults.
JAMA. 1997; **278**: 369-375
View in Article
Scopus (4)
PubMed | Crossref | Google Scholar

40. Gilman DA
Not and impulsive survivor. John Wiley & Sons, New York1978
View in Article
Scopus (1)
Google Scholar

41. Brown W - Gallup Jr.
Physical violence in American families. Transaction Press, New Brunswick1990
View in Article
Scopus (1)
Google Scholar

42. Wyatt GE
The sexual abuse of Afro-American and White-American women in childhood.
Child Abuse Negl. 1985; **9**: 507-519
View in Article
Scopus (613) | PubMed | Crossref | Google Scholar

43. National Center for Health Statistics. Exposure to alcohol-related crime in the home: United States, 1992-1993. Vital Health Stat 13. U.S. Department of Health and Human Services, Washington, DC; September 30, 1981.
View in Article
Scopus (1)
Google Scholar

44. Siegel PZ Frazier EL, Mitchell P, et al. Behavioral risk factor surveillance, 1991. Monitoring progress toward the Nation's Health Promotion Objectives. Morb Mortal Wkly Rep. 1993;42(SS-4):1-12.
View in Article
Scopus (1)
Google Scholar

45. Cooper CJ - Kalayasiri S - Heath DB - Gerszya CT
Leisure-time physical activity among US adults.
J Clin Epidemiol. 1995; **108**: 312-318
View in Article
PubMed | Crossref | Google Scholar

46. U.S. Department of Health and Human Services. Physical Activity and Health: A Report of the Surgeon General. Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion; 1996.
View in Article
Scopus (1)
Google Scholar

47. Rivara FP - Mackie EM - Gomes G - Mendoza CT - Kuykendall D - Anderson HL
Alcohol and illicit drug abuse and the risk of violent crime among adults.
JAMA. 1997; **278**: 369-375
View in Article
Scopus (4)
PubMed | Crossref | Google Scholar

48. Dillman DA
Mail and telephone surveys. John Wiley & Sons, New York1978
View in Article
Scopus (1)
Google Scholar

49. Straus M - Gelles RJ
Physical violence in American families. Transaction Press, New Brunswick1990
View in Article
Scopus (1)
Google Scholar

50. Wyatt GE
The sexual abuse of Afro-American and White-American women in childhood.
Child Abuse Negl. 1985; **9**: 507-519
View in Article
Scopus (613) | PubMed | Crossref | Google Scholar

51. National Center for Health Statistics. Exposure to alcohol-related crime in the home: United States, 1992-1993. Vital Health Stat 13. U.S. Department of Health and Human Services, Washington, DC; September 30, 1981.
View in Article
Scopus (1)
Google Scholar

52. Siegel PZ Frazier EL, Mitchell P, et al. Behavioral risk factor surveillance, 1991. Monitoring progress toward the Nation's Health Promotion Objectives. Morb Mortal Wkly Rep. 1993;42(SS-4):1-12.
View in Article
Scopus (1)
Google Scholar

53. Cooper CJ - Kalayasiri S - Heath DB - Gerszya CT
Leisure-time physical activity among US adults.
J Clin Epidemiol. 1995; **108**: 312-318
View in Article
PubMed | Crossref | Google Scholar

54. Rivera FP - Mackie EM - Gomes G - Mendoza CT - Kuykendall D - Anderson HL
Alcohol and illicit drug abuse and the risk of violent crime among adults.
JAMA. 1997; **278**: 369-375
View in Article
Scopus (4)
PubMed | Crossref | Google Scholar

55. SAS Procedures Guide. SAS Institute Inc. Version 6, 3rd edition. Cary, NC: SAS Institute; 1990.
View in Article
Scopus (1)
Google Scholar

56. Fenton GG - Range LM - Lewis DO
Child abuse.
Child Abuse Negl. 1990; **14**: 237-251
View in Article
Scopus (21) | PubMed | Crossref | Google Scholar

57. Williams LM
Recovered memories of abuse in women with documented child sexual victimization histories.
J Traumatic Stress. 1995; **8**: 649-673
View in Article
PubMed | Crossref | Google Scholar

58. Cancrola TP
Alcohol, depression, nicotine addiction, and smoking cessation.
J Psychoactive Drugs. 1989; **21**: 331-342
View in Article
Scopus (126) | PubMed | Crossref | Google Scholar

59. Anda RF - Williamson DF - Escobedo LG - Mast EE - Giovino GA - Remington PL
Depression and the dynamics of smoking. A national perspective.
JAMA. 1990; **264**: 1541-1545
View in Article
Scopus (276) | PubMed | Crossref | Google Scholar

60. Glassman AH - Helzer JE - Covey LS - Cottler LB - Stetner F - Tipp JE - Johnson J
Smoking, smoking cessation, and major depression.
JAMA. 1990; **264**: 1546-1549
View in Article
Scopus (189) | PubMed | Crossref | Google Scholar

61. Hughes JR
Clonidine, depression, and smoking cessation.
JAMA. 1990; **264**: 2851-2852
View in Article
Scopus (19) | PubMed | Crossref | Google Scholar

62. Pomerleau OF - Pomerleau CS
Neuroregulators and the reinforcement of smoking: Towards a conceptual model.
Neurosci Biobehav Rev. 1984; **8**: 503-513
View in Article
Scopus (204) | PubMed | Crossref | Google Scholar

63. Hardy JB - Green S
Family support and parenting education in the home: An early look.
Child Youth Serv. 1978; **1**: 187-204
View in Article
Scopus (18) | PubMed | Abstract | Full Text PDF | Google Scholar

64. Olds DL - Henderson CR - Chamberlin R - Tatelbaum R
Preventing child abuse and neglect: A randomized trial.
Pediatrics. 1986; **78**: 65-78
View in Article
Scopus (1)
PubMed | Google Scholar

65. Olds DL - Eckenrode J - Henderson CR - Kitzman H - et al
Long-term effects of home visitation on maternal life course and child abuse and neglect.
JAMA. 1997; **278**: 637-643
View in Article
PubMed | Crossref | Google Scholar

66. U.S. Advisory Board on Child Abuse and Neglect. Child abuse and neglect: critical first steps in response to a national emergency. Washington, DC: U.S. Government Printing Office; August 1990; publication no. 017-092-00104-5.
View in Article
Scopus (1)
Google Scholar

67. U.S. Advisory Board on Child Abuse and Neglect. Creating communities: blueprint for an effective federal policy on child abuse and neglect. Washington, DC: U.S. Government Printing Office; September 1991.
View in Article
Scopus (1)
Google Scholar

68. MacMillan HL - Fleming JE - Trocme N - Boyle MH - et al
Prevalence of child physical and sexual abuse in the community. Results from the Ontario Health Supplement.
JAMA. 1997; **278**: 131-135
View in Article
Scopus (4)
PubMed | Crossref | Google Scholar

69. Perry S
Family violence and the adolescent.
Maryland Med J. 1984; **40**: 301-302
View in Article
PubMed | Google Scholar

70. Chandavarkar RM
Preventing low birth weight, child abuse, and school failure.
Indian Pediatr. 1993; **30**: 64-71
View in Article
Scopus (24) | PubMed | Crossref | Google Scholar

71. Kashani JH - Daniel AE - Dandoy AC - Holcomb WR
Family violence.
Am J Psychiatr Adolesc Psychiatry. 1992; **31**: 181-189
View in Article
Scopus (34) | PubMed | Crossref | Full Text PDF | Google Scholar

72. Dubowitz H
Pediatrics in programs and pediatric residency training.
Pediatrics. 1988; **82**: 477-482
View in Article
Scopus (1)
PubMed | Crossref | Google Scholar

73. Tatelchow J - Henry F - Clancy J
Perceptions of child sexual abuse as a public health problem. Vermont, September 1985.
Rocky Mtnal Med Psy. 1987; **84**: 421-423
View in Article
Scopus (1)
PubMed | Google Scholar

74. Kaufman JH - Clarke MC - Valverde WO - Hanna FP
Inquiry about victimization experiences. A survey of patient preference and practice in the primary care setting.
Arch Int Med. 1993; **153**: 1148-1156
View in Article
Scopus (24) | PubMed | Crossref | Google Scholar

75. Council on Scientific Affairs
Adolescent Violence and Abuse Diagnosis and Treatment Guidelines on Domestic Violence.
Arch Fam Med. 1993; **2**: 38-47
View in Article
Scopus (1)
Google Scholar

76. Hamberger LK - Saunders DG - Hovey M
Prevalence of domestic violence in community practice and rate of physician inquiry.
Fam Med. 1992; **24**: 283-287
View in Article
Scopus (1)
Google Scholar

78. Friedman LS - Samet JH - Roberts MS - Hans P
Inquiry about victimization experiences. A survey of patient preference and practice among primary care physicians.
Arch Int Med. 1992; **152**: 1186-1190
View in Article
Scopus (24) | PubMed | Crossref | Google Scholar

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