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LIFE EVENTS AND SUBSEQUENT ILLNESS[1]

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The objective was to examine for relationships between stress, as measured by life events, and hospitalization or death during the following 6 to 12 months, using a case-control design. As part of the Community Mental Epidemiology Program, life events data for the preceding year were gathered on a random sample of the population at two sites, and health data for the interval between interviews were collected at follow-up. A case is defined as anyone becoming ill and being hospitalized or dying during the interval between interviews. Each case was individually matched by several variables to a control who had neither been sick nor hospitalized. There were no significant demographic differences between cases and controls in either site or between sites. When life events were examined by various scoring methods, there were no differences between cases and controls. This finding is important since most longitudinal studies that have shown a positive relationship between life events and subsequent illness have had methodologic limitations or have been based on healthy, young, male populations who generally did not become seriously ill during the study period. The results of this study plus the lack of generalizability of previous findings and their somewhat conflicting results raise serious questions about the etiologic relationship of life events to subsequent illness.

death; health surveys; hospitalization; life events; stress

INTRODUCTION

The effects of mental stress on the body and its functions have been recognized in a general way since the early days of recorded history. Hippocrates discussed physical symptoms brought on by specific emotional states (1). Major scientific tests of this belief began with Cannon who reported in 1929 that strong emotions could cause definite physiologic changes (2). Among the clinical applications of this work was Adolf Meyer's teaching that a chart of important events in a person's life could often be helpful in arriving at a medical diagnosis (3). This was followed by other work in the field of psychosomatic

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medicine implicating stressful events as precursors of disease (4, 5).

Following Meyer's work, a variety of research instruments including open-ended interviews and structured questionnaires have been used in attempts to quantify the impact of life events. Holmes and Masuda, working with others, used a life chart device to study events that preceded the onset of various diseases (6). This work led to the Social Readjustment Rating Questionnaire in which each life event was given a weight obtained by using the methods of psychophysics (7, 8). The scale is based on the concept that any change, pleasant or unpleasant, is considered a stressor (9). A list of 43 events "whose advent is either indicative of or requires a significant change in the ongoing life pattern of the individual" was presented to 394 subjects (10). They were asked to rate each event against marriage as a standard, which was given a weight of 500. A value was given to each event depending on whether it would take more or less adjustment than marriage. Based on the entire sample, the weight for each event became the mean value divided by ten (7). These weights were found to be similar for different demographic subgroups. Adding the weights for each reported item yields a total Life Change Unit score for an individual.

Since then, several studies have compared the rankings of the life events of the Social Readjustment Rating Questionnaire among a variety of populations. Masuda and Holmes showed that the rankings given by Japanese and American samples were similar (11). Rahe demonstrated correlations ranging from .62 to .94 between rank orderings of the life events by a variety of population samples, including white, black, Hawaiian and Mexican Americans, and Japanese, Danish, and Swedish people (12). Harmon et al. administered the Social Readjustment Rating Questionnaire to samples of the French, Belgian and Swiss populations. They found the weights given to life events by those groups to be similar to the weights from the American groups and a composite European group (13). Other methodologic studies have also supported the finding that a variety of people agree on the seriousness of life events (14, 15). Differences noted in the ranking of certain individual events, have been attributed to the cultural backgrounds of the subjects (8, 12, 13).

Although Dohrenwend, when examining the psychologic effect of stressful life events, felt that "change rather than undesirability is the characteristic of life events that should be measured for the more accurate assessment of their stressfulness" (16), some authors feel that this kind of weighting is not the best way to measure stressfulness of life events. Life events have been categorized as gains or losses, according to their independence of each other and their desirability; and as exits and entrances of important persons from the social field of the individual (17–22). There is much overlap among the items considered to be losses, undesirable, or exits as well as among events categorized as gains, desirable, or entrances by various workers.

A number of retrospective studies have shown positive relationships between physical and mental illnesses and prior life events, expressed as numbers of events, weighted scores, or number of independent events (17, 23–28). However, the validity of these studies has been questioned because life events were gathered after the illness had been identified, raising the possibility that sick persons recalled or reported an excess of events in looking for explanations of their illnesses.

Rahe et al. examined medical records of 50 servicemen discharged because of psychiatric illness and found that clusters of life events occurred during the year preceding a cluster of illnesses or a single illness (29). Unfortunately, it is not clear when the

data of the social histories in the health records were gathered. If this information was recorded at the time of the illness, this study is open to the same criticisms as other retrospective studies.

Using a prospective design, approximately 2500 servicemen aboard three U.S. Navy ships were asked about recent life events before starting on cruises which lasted from six to eight months. When the ships returned, the medical records for the cruise period were examined. A positive relationship was found between the number and intensity of the subject's life changes for the six months before the start of the cruise, and illness reported during the cruise periods. However, only a small percentage of the people accounted for a large percentage of the illnesses; most of the sickness reported was minor; and the few life events reported were also minor (30, 31).

Two similar studies were carried out by Rubin et al., one involving the entire enlisted crew of a battleship and the other a third of the crew of an attack carrier (32, 33). In both cases, a history of recent life events was taken for the 18-month period prior to the start of cruises. Illnesses occurring during the cruise period were later abstracted and tabulated. Utilizing data from a randomly selected half of the subjects, a new weighting system for the life events was derived by stepwise multiple regression analysis. The events preceding illnesses among unrated seamen were different from those preceding illnesses of petty officers. Among unrated seamen the preceding events were different for the two ships. Life Change Units derived from non-military populations did not predict future illness among the men in these studies, but the weighting systems specific to each ship did so, with persons having the highest Life Change Unit scores having the most illnesses. The authors state the need for caution in interpreting these findings because weights derived from one-half of the population predicted illnesses poorly among the other half (32). In addition, the illness rate on the attack carrier was so low that the standard deviations were often higher than the mean number of illnesses.

Other prospective studies among young people were based on relatively few serious illnesses. Nevertheless, Cline and Chosy found that Life Change Unit scores for an 18-month period preceding a part-time officers' training program were positively associated with health changes reported during the following year (34). In another study, students who sought medical care had significantly higher mean scores on a life change inventory than did those not seeking care (35). However, because the relationship between severity of illness and preceding life change inventory scores accounted for only a small portion of the variance, it was not felt to be very helpful in a practical sense. These authors concluded that "the role of physiologic dysfunctioning in relationship to life stress and seeking treatment for illness remains unclarified" (36).

Casey et al., when studying a group of army inductees, failed to find a significant relationship between Life Change Unit scores and the occurrence of illness, although they did show a statistically significant difference between these scores and the levels of health care obtained. A larger percentage of persons with high scores received high levels of health care than persons with lower scores (37).

A modified version of the Schedule of Recent Events was used by Thurlow in a prospective study of 111 employees of a Canadian brewery. Various indices of life change showed significant relationships with the number of days off for illness during a subsequent two-year period. However, these relationships did not hold up when the effects of other independent variables were controlled by multiple regression. When analyzed retrospectively for a five-year period, a relationship was shown

between the subjective items of the Schedule of Recent Experience, the number of illnesses experienced, and the number of days off for illness. Even though this relationship remained significant when other independent variables were held constant, the author concluded that past illnesses were the best predictor of future illnesses and past absenteeism best predicted the occurrence of future absences (38).

The most extensive prospective study was reported by Theorell et al. (39). In a population of 9097 middle-aged males, these authors were unable to demonstrate relationships between high life events scores and deaths from all causes or most types of illnesses which occurred during a 12- to 15-month follow-up period. There were exceptions, however. Neurosis in the follow-up period was more common among men with high scores initially. A similar association was noted for all illnesses combined among men 41 to 51 years of age but not among men 52 to 61 years of age. Several of the individual life events were also related to deaths from all causes and to some illness categories.

A positive concurrent relationship between life events, as scored by a variety of methods, and psychophysiologic status as measured by a modification of the Health Opinion Survey and the Langner 22-Item Symptom Scale has also been reported (21, 22, 40). In addition, Uhlenhuth et al. reported that in a randomly selected sample of the population in Oakland, California, a positive relationship was shown between the intensity of psychiatric symptoms and life stress. The psychiatric symptoms were measured by 54 items from the Hopkins Symptom Checklist and life stress was measured by a list of life events (41).

Two longitudinal studies, with subjects randomly selected from the general population, have reported that when stressful life events occur, symptoms of psychologic disturbance are also likely to occur (42, 43). However, the correlation between life events and psychophysiologic symptoms could be built in to some extent (44). Both of the scales used to measure symptoms the Health Opinion Survey and the Langner Scale, include questions about symptoms of illness that would unavoidably correlate to life events relative to illness.

None of the evidence that stresses, from an accumulation of life events, can in some way cause illness is incontrovertable. The retrospective studies have been criticized on the grounds of possibly biased histories of life events obtained from patients (45), interaction between the occurrence of the event and the illness (20, 46), and a variety of methodologic problems (46, 47). The longitudinal studies have shown mixed results and, for the most part, have dealt with healthy, young, male populations who rarely became seriously ill during the study period. Because of the unsettled importance of stress from life events as precursors of disease, findings from large-scale prospective studies in two general populations were utilized to examine the relationship between illness and prior life events.

Materials and Methods

The Community Mental Health Epidemiology Program was conducted similarly in Kansas City, Missouri, and in Washington County, Maryland. In Kansas City, cluster sampling was utilized to obtain a random sample of dwelling units. In Washington County, dwelling units were selected by systematic sampling from a random start, using as the frame an updated private census originally carried out in 1963 (48). In both locations the individual to be interviewed was randomly chosen from adults 18 years of age or older in the selected household.

Interviewing began in Kansas City in October 1971 and continued through January 1973. Twenty-eight dwelling units were selected each week for a total of 1792. There were 173 which were either vacant,

torn down or contained no household (e.g., a building containing no household might contain a store), leaving 1619 available for interview. From these households 1173 interviews were obtained, a response rate of 72 per cent.

Interviewing for this study in Washington County, Maryland, was carried out between December 1971 and July 1973. During the first 13 months, a sample of 33 dwelling units was drawn weekly. For the balance of the study, monthly samples of 100 each were drawn. This method resulted in the selection of 2269 dwelling units of which 199 were either vacant or torn down, leaving 2070 available for interviews. A total of 1673 persons was interviewed, a response rate of 80 per cent.

In addition to questions about a variety of demographic, health and psychosocial variables, the initial questionnaire included a life events list based on Holmes and Rahe (7) and revised by Dohrenwend and Dohrenwend (49) (see table 2). At this interview, each subject reported whether or not the event had taken place during the previous year.

In Kansas City, 343 people were reinterviewed between July 1973 and December 1973, twelve months after the initial interview. A response rate of 78 per cent was obtained. Between August 1973 and April 1974 a second round of interviews was requested from a group of the original respondents in Washington County. Six hundred sixty persons were reinterviewed for an overall response rate of 79 per cent. The reinterview utilized a shortened version of the first questionnaire. Several of the scales were dropped and detailed questions about illnesses, disability, and hospitalization were added. Questionnaires for both the original interview and the reinterview were the same in Kansas City and Washington County.

In Washington County only, variable intervals between interviews (6 and 12 months) were chosen to allow an estimate of the point at which the best balance could be obtained between memory lapses and losses from follow-up, both of which lead to decreasing information with time; and length of the follow-up interval, which leads to increasing information. Because there were no statistically significant differences between the respondents for the various time intervals by sex, race, age, marital status, income, education or geographic locations within the county, data from these two follow-up groups were combined.

Subjects for this study were the respondents to the follow-up questionnaire at both sites, confining the selection to whites because of the small number of non-white respondents. A case is defined as any person who died or was hospitalized during the follow-up interval for an illness starting after the first interview. Of the cases, 67 were hospitalized and 16 had died. Controls were selected from respondents to the reinterview who did not report any new illnesses or hospitalizations during the interval. A control was individually matched to each case by length of follow-up interval, sex, employment status, education, income, and age within five years in each direction.

Results

The final study group is composed of 83 matched pairs of cases and controls, 36 from Kansas City and 47 from Washington County (see table 1). Almost 68 per cent of the Kansas City cases were female, 39 per cent were in the age group of 45–64, and 42 per cent were working at the time of the interview. In the Washington County sample, 66 per cent of the cases were female, most were in the age group 18–44, and a bare majority (51 per cent) of the cases were working when first interviewed.

No statistically significant differences were found between cases and controls on any variable used for matching in either community. In addition, there were no

TABLE 1

Characteristics of cases and controls by demographic variables used for matching: Washington County, MD, and Kansas City, MO

Characteristic	N = 83 pairs	
	Cases (%)	Controls (%)
Location		
Washington County	56.7	56.7
Kansas City	43.3	43.3
Sex		
Female	66.3	66.3
Male	33.7	33.7
Age		
18–44	39.8	42.2
45–64	33.7	28.9
65 and over	26.5	28.9
Occupational Status		
Working	47.0	49.4
Housewife	24.1	25.3
Retired/student	25.3	22.9
Not working but looking for work	3.6	2.4
Educational Status		
College degree or better	12.0	7.2
1 yr, to <4 yrs. college	16.9	15.7
High school degree	22.9	33.7
7–11 grades	36.1	34.9
<7 grade	12.0	8.4
Income		
<4,000	31.3	24.1
4,000–7,999	18.1	18.1
8,000–11,999	12.0	22.9
12,000–15,999	21.7	20.5
16,000–25,999	9.6	9.6
Other	7.2	4.8
Interval		
6 months	6.0	6.0
12 months	94.0	94.0

differences in any of the matching variables between the two sites. All Kansas City respondents were urban dwellers, while Washington County respondents included urban, suburban, rural and small town residents.

Because the case-control relationships were similar for both study locations, the Kansas City and Washington County results have been combined for the rest of this presentation.

Subjects did not report many life events occurring during the one-year period before the first interview. The median number of events for cases and controls was 2.2 and 2.0, respectively. The distributions for cases and controls shown in figure 1 parallel each other closely. Both curves are skewed to the right; the majority of both cases (57.8 per cent) and controls (62.7 per cent) have scores of two or less. Each group had 14 (16.8 per cent) persons with scores of five or more.

Table 2 displays the number of cases and controls who reported the occurrence of each event. There are 13 events which were reported by no more than one person in either group. Taking a vacation was the most frequently reported event by both groups. The most serious events reported in any quantity were related to the health of the respondent or the death of a person important to the respondent. Fifteen events were reported by more cases than controls and 12 events were reported by more controls than cases.

Because many of the events were reported by very few people, differences between individual events were examined only for those which were reported by at least five persons in either group. Results of the matched pairs analysis using McNemar's test (50) are given in table 3. There were no statistically significant differences between the cases and controls although for the event "illness or injury" the estimated relative risk of subsequent hospitalization or dying is 1.8 for the cases as compared to the control group.

Various methods of scoring life events based on the work of others were replicated for comparative purposes. A commonly used method is to compare the number of persons in various groups who reported the occurrence of at least one event during a specified time period (17, 21, 26). The total count shown in table 4 shows little difference between cases and controls, although fewer controls than cases reported at least one event.

Many authors feel that the quality of the event taking place is an important factor to be taken into account when studying the effects of life events, rather than the simple accumulation of events (17, 21, 25, 26). Based upon work performed by Dohrenwend and Dohrenwend (49) each event on

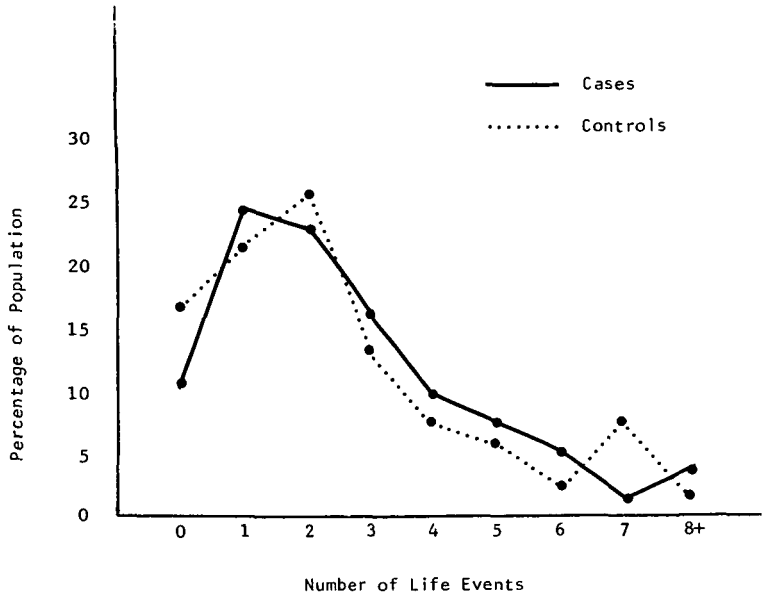

FIGURE 1. Percentage distribution of cases and controls by number of life events.

table 2 was classified as a gain or loss to the respondent or as an ambiguous event belonging to neither group. A gain was an event or change usually thought to be desirable by others and a loss was an event or change usually thought to be undesirable. If there was disagreement or insufficient information for a decision about the event it was classed as ambiguous. For none of these categories (gains, losses, ambiguous) was there a statistically significant difference between cases and controls in the proportion of persons reporting one or more events (see table 4).

The full life events list used in the present study included 41 items, although only 20 of them are considered similar enough to items on the original list of Masuda and Holmes (8) to apply the weights derived by them as a measure of the social readjustment required when the event occurs (see table 5). Markush and Favero (40) generated total Life Change Unit scores for each individual from these 20 items by adding the geometric mean scores for all events that took place during a one-year period. The scores given in table 6 were obtained by the same method and were grouped using previously reported cut-off points (40). The chi-square obtained by the method of Fleiss and Everitt (51) for matched pairs with multiple outcomes does not reach the level of statistical significance ($p > .30$).

The 20 weighted items were also used to obtain scores indicating the overall direction of desirability of events. Following the method used by Dohrenwend (22), the weight for each gain item was given a negative sign, and the weight for each loss item a positive sign. Ambiguous items were weighted zero. The algebraic sum of these weights was the overall score. If the final score was negative, it was classified as desirable; zero scores were called neutral, and positive scores were classified as undesirable. There were no significant differences ($p > .50$) between the cases and controls in these categories (see table 7).

DISCUSSION

Although early studies showed positive correlations between life events and illness, criticisms of the methods used have been

TABLE 2

Occurrences of life events as classified by Dohrenwend and Dohrenwend (49) for cases and controls for both Washington County, MD, and Kansas City, MO (N = 83 matched pairs)

Life event	No. of persons having event		Differences
	Cases	Controls	Cases less controls
Classified as gain			
Engaged	1	1	0
Married	2	0	+
Other new love relationship or important friendship	6	5	+
Birth of first child	1	0	+
Improvement in health	22	18	+
Started school or training program, etc.	2	2	0
Graduated from school or training program etc.	2	2	0
Started to work—first time	1	2	-
Job or own business improved in responsibility, type, location or some other way	10	9	+
Major gains in income not due to change in work	6	4	+
Acquisitions of property	1	3	-
Released from prison, acquitted of other than minor traffic offenses	0	0	0
Changed residence for better one	6	6	0
Started new hobby or recreational activity	13	14	-
Acquired a pet	13	11	+
Took a vacation	36	40	-
Classified as loss			
Widowed	0	0	0
Divorced	0	1	-
Separated	1	0	+
Other broken love relationship or important friendship	2	2	0
Miscarriage or stillbirth	1	0	+
Family member left home	6	5	+
Illness or injury	28	19	+
Death of loved one or other important person	19	20	-
Quit or failed school or training program, etc.	0	1	-
Job or own business downgraded in responsibility, type, location or some other way	2	2	0
Laid off or fired from job or own business failed	3	3	0
Major loss of income not due to change in work	1	2	-
Serious property loss	1	0	+
Arrested, indicted, convicted of other than minor traffic offenses	0	0	0
Changed residence for worse one	0	1	-
Dropped hobby or recreational activity	3	2	+
Lost a pet	8	8	0
Classified as ambiguous			
Pregnancy	4	2	+
Birth of child other than first	0	2	-
New person in home other than birth of new child	4	4	0
Entered armed services	0	0	0
Left armed services	0	0	0
Retired from work	3	1	+
Started at a new type of work	5	8	-
Other major event	2	3	-

increasing (19, 45, 47, 52, 55). A review of the literature shows methodologic limitations and conflicting findings. The lack of any statistically significant differences between the cases and controls in this study, regardless of scoring method used, lends weight to the cautious interpretations of some (32, 33, 36) and the negative findings of others (37, 38, 45, 55).

An attempt has been made in this work to avoid some of the pitfalls encountered by previous studies. Specifically, the problems addressed include retrospective study design, use of limited samples, little reporting of serious illness among subjects, and inappropriate controls. Although the present analysis is based on case-control comparisons, the study was prospective in nature. While information concerning the occurrence of the listed life events was

TABLE 3

Matched pairs analysis of individual events reported by at least five persons: Washington County, MD, and Kansas City, MO (N = 83 matched pairs)*

Event	Reported by					
	Both members	Case only	Control only	Neither	χ^2	Significance level
Other new love/important relationship	1	5	4	73	0	NS
New person in home	0	4	4	75	.13	NS
Family member left home	1	5	4	73	0	NS
Illness or injury	8	20	11	44	2.1	NS
Improvement in health	5	17	13	48	.30	NS
Death of loved one/important person	4	15	16	48	0	NS
Job/business improved	4	6	5	68	0	NS
Started new type work	0	5	8	70	.31	NS
Major gain in income	1	5	3	74	.13	NS
Changed residence—better	0	6	6	71	.08	NS
Started new hobby	5	8	9	61	0	NS
Acquired a pet	2	11	9	61	.05	NS
Lost a pet	3	5	5	70	.10	NS
Took a vacation	24	12	16	31	.29	NS

* McNemar's Test using 1 degree of freedom (50).

TABLE 4

Matched pairs analysis of life events by various scoring methods: Washington County, MD, and Kansas City, MO (N = 83 matched pairs)*

Scoring methods	One or more life events reported by				χ^2	Significance level
	Both members	Case only	Control only	Neither		
Total count	61	13	8	1	0.76	NS
Gain count	46	13	18	6	0.50	NS
Loss count	24	24	20	15	0.20	NS
Ambiguous	3	14	14	52	0.04	NS

* McNemar's Test using 1 degree of freedom (50).

gathered retrospectively at the initial interview for the preceding 12 months, a history of illness for the subsequent time period was obtained at a second interview. This method eliminates the possibility of increased recall of life events by sick subjects that might occur when data on both life events and illness were gathered at the same time.

Subjects of much of the previously reported prospective research have been young, healthy males who were members of the armed services or students. One strength of the present study is that both cases and controls were drawn from two independent populations with a broad range of characteristics. The conclusions need not, therefore, be limited to specific age, sex, occupational or educational groups. Furthermore, matching on these and other independent variables virtually eliminates any effects these variables might have had on the analysis, thereby improving the generalizability of the findings.

Because of the youthfulness and health of subjects in previous studies, most of the reported illnesses were minor in nature. In this study, cases were restricted to persons with illnesses serious enough to require

TABLE 5

Life change units derived from Masuda and Holmes (8) as classified by Dohrenwend and Dohrenwend (49)

Event	Life change score
Classified as gain	
Marriage	500
Birth of first child	337
Start of school or training, etc.	191
Graduate of school or training, etc.	191
Improvement in responsibility, type, location of job or own business	243
Change of residence for better	140
Started new hobby or recreational activity	127
Took a vacation	74
Classified as loss	
Widowhood	771
Divorce	593
Separation	516
Illness or injury	416
Death of a loved one or other important person	469
Downgrading in responsibility, type, location of job or own business	308
Unemployment or failure of business	378
Change of residence for worse	140
Dropped hobby or recreational activity	127
Classified as ambiguous	
Pregnancy	284
Birth of child other than first	337
Retirement	361

TABLE 6

Matched pairs analysis of weighted† life events scores: Washington County, MD, and Kansas City, MO*

	Cases			
	0-335	336-642	643+	Total
Controls				
0-335	18	16	9	43
336-642	11	7	6	24
643+	8	4	4	16
Total	37	27	19	83
N = 83 matched pairs χ^2 = 1.68 df = 2 NS				

* Fleiss and Everitt statistic using 2 degrees of freedom (51).

† Each item weighted by geometric mean obtained by Masuda and Holmes (8).

TABLE 7

Matched pairs analysis of scores weighted to indicate desirability or undesirability (22): Washington County, MD, and Kansas City, MO*

Controls	Cases			
	Desirable score	Neutral score	Undesirable score	Total
Desirable score	9	4	14	27
Neutral score	3	5	13	21
Undesirable score	12	7	16	35
Total	24	16	43	83
N = 83 matched pairs χ^2 = 1.35 df = 2 NS				

* Fleiss and Everitt statistic using 2 degrees of freedom (51).

hospitalization or to cause death, thereby limiting the results to undeniably important measures of ill health.

The second most frequently reported life event in these two populations was illness or injury during the preceding year. Although the difference between the cases and controls on this event does not reach the level of statistical significance, more cases than controls reported illness during the previous year at the initial interviews. This is in the direction of the results of others, such as Hinkle and his coworkers,

who found that people with a history of frequent illnesses were most likely to become sick in the future. Hinkle also argues that life events are much more likely to precipitate illness among frequently ill persons who seem to have some kind of susceptibility (56). Thurlow's work corroborates this to the extent that past illnesses were the best predictor of future illnesses among his study subjects (38). One problem with many lists of life events, including the one used in this study, is that one cannot be certain that the illnesses reported as life events were truly independent of the subsequent illnesses counted as outcomes. Indeed, it can be argued that when illness is the outcome, illness should not be an independent variable. If illness were removed from the life events list used in this study, the slight tendency for cases to have more life events than controls would disappear.

Change per se is the concept upon which much of the research using life events as a measure of stress is based. A count of all persons reporting one or more events, and total scores of 20 items weighted to indicate amount of readjustment required when the event occurred were two methods of analysis used here to examine change. Because no differences were shown between cases and controls by either method, it appears that change, in and of itself, is not a precursor of serious illness.

A further group of studies has been based on the concept that only socially negative events are related to subsequent ill health. To examine this hypothesis, items considered as socially defined losses and gains were grouped; a score for desirability was also generated. Again, it was not possible to corroborate the finding by others that events with negative connotations were more highly associated with illness than positive events (17, 26, 28).

Given the state of knowledge concerning the relationship between life events and subsequent illness, what direction should further research take? A first step would seem to be a reevaluation of the use of lists of life events as indicators of the stress which the occurrence of such events may evoke, possibly followed by the development of a different measurement instrument. Additional investigation of the association of life events with important illnesses could then follow. Further retrospective studies seem impractical both because of biased recall and because of possible interaction between events and diseases, particularly mental illnesses. More in order are well designed prospective studies using random samples of the population, a range of outcome illnesses, outcome variables clearly distinguishable from independent variables, and an account of the effects of mediating factors. As for the events themselves, they should be counted as stressors only if seen that way by the respondent himself (20, 56, 57). The possibility of using life events as indicators of the kinds of stress that may lead to illness is still sufficiently attractive to warrant further well planned and properly conducted investigations.

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