Brief Report: Psychological Symptoms in Healthy Female Siblings of Adolescents With and Without Chronic Conditions

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Objective: To examine the psychological impact of having a sibling with a chronic condition on healthy adolescent females and to explore the potential moderating role of birth order on this relationship.

Method: We compared selected Brief Symptom Index subscales (anxiety, depression, interpersonal sensitivity, hostility) and global severity scores (GSI) in two groups of healthy, inner-city female adolescents matched for sibling age, gender, birth order, and age spacing: 34 sisters of males and females ages 13–19 years with chronic health conditions (ILLSIBS) and 34 sisters of males and females in the same age range without conditions (WELLSIBS).

Results: ILLSIBS generally had more symptoms than WELLSIBS. MANOVA yielded significant three-way interactions of sibling illness status, birth order, and gender for the anxiety, hostility, and GSI. A similar pattern was nonsignificant for the two other subscales. Among younger sisters in general and among older sisters of males only, ILLSIBS had higher scores; however, ILLSIBS who were older sisters of females did not differ significantly in symptom levels from the comparable group of WELLSIBS.

Conclusions: Psychological symptoms in sisters of inner-city, male and female adolescents are related to sibling health status. However, the combination of sibling gender and birth order may modify this relationship and should be considered when evaluating psychological risk or designing interventions.

Key words: adolescents; chronic illness; psychological distress; siblings.
that many healthy siblings adjust quite well. In addition, many factors may influence the level of distress they report. For example, study results have tended to vary depending on the birth order and gender make-up of the sibling dyads examined (Howe, 1993; Williams, 1997). This is not surprising given that roles and role symmetry are important components of the sibling relationship and may be related to these factors (Stoneman & Brody, 1993). Some specific evidence suggests that girls whose younger siblings have chronic conditions are more likely to experience internalizing problems such as depression and anxiety (Lobato, Faust, & Spirito, 1988). Male siblings, especially those who are younger than the affected child, are thought to be at risk for aggression (Howe, 1993). However, variables such as sibling gender and birth order typically have not been investigated together in well-controlled studies (Howe, 1993).

The purpose of this analysis was to extend the current body of knowledge about the adjustment of healthy adolescent girls whose siblings have chronic conditions. The decision to include only sisters was both theoretical and practical. As noted, in some studies, boys have been found to display different reactions from girls to having siblings with health conditions, particularly in terms of aggressivity. There also were more female patients available for screening at the medical center. Enrolling boys would have required an increased sample size and more time to identify and interview participants, both of which were beyond the resources available to the investigators. Thus, we restricted the investigation to sisters. Our goals were to (1) compare levels of psychological symptoms in healthy adolescent girls whose sisters or brothers either did or did not have chronic conditions, and (2) explore the potential moderating role of birth order on the relationship between psychological symptoms and sibling health status. Based on the literature, we posited that sisters of adolescents with chronic conditions would have more symptoms than sisters of adolescents without conditions, and that birth order and sibling illness status would interact so that symptoms would predominate in older sisters of adolescents with conditions.

Method

Recruitment Procedures

Two equal-sized groups of healthy female adolescents were recruited: 34 were older or younger sisters of adolescent boys and girls with chronic conditions (ILLSIBS) and 34 were older or younger sisters of adolescent boys and girls without chronic conditions (WELLSIBS). Each participant and her “index” sibling was from 13 to 19 years old. To identify potential participants, a doctoral student in health psychology (M.J.F.) approached male and female patients 13 to 19 years old attending the adolescent and pediatric general and subspecialty clinics or hospitalized in the adolescent inpatient unit at a large, urban, university-affiliated medical center. They were asked to complete a brief screening interview to determine if they or a family member might be eligible for a study looking at the lives of adolescents receiving health care at the medical center. The interview asked for some basic demographic information (e.g., age, gender, grade) and about any ongoing health problems or medical conditions they had themselves. Additional questions asking about persons residing in the household were used to determine if they lived with an adolescent sibling who met the study criteria.

Of 150 adolescents approached, 135 (90%) agreed to be screened and to have an eligible family member contacted (when the person approached for screening was under age 18, both their own assent and parental consent were obtained). This screening procedure yielded 91 sibling dyads who potentially qualified for the study, but two eligible sisters declined to participate; all but two pairs were identified from outpatient sources. The eligible dyads then were stratified by sibling illness status, gender, birth order, and age spacing (more or less than 2 years apart) to assure that the WELLSIBS and ILLSIBS groups were frequency matched by these characteristics. There were 68 healthy girls who completed the survey after signed consent/assent forms from the participant and/or her parent (as appropriate) were received; 90% were interviewed by telephone. Participants were paid $10.00. The study protocol was approved by the Institutional Review Board.

Sample Characteristics

The sociodemographic characteristics of the 68 participating girls reflected the inner-city patient population served at the medical center. Most were of minority ethnic backgrounds (Hispanic, 63%; Black, 19%) and from families of low to moderate socioeconomic status (68% received Medicaid and/or public assistance). The average household size was five persons. Less than a third of the dyads
(29%) lived with two biological parents, and more than half (53%) lived with their mother only; the remainder lived in other family types such as with mother and stepfather, father only, or the maternal grandmother. The mean age of participants was 16.3 years. Older sisters (mean = 16.8, SD = 1.8, range = 14–19) and younger sisters (mean = 15.9, SD = 2.0; range = 13–19) had mean ages about 1 year apart. ILLSIBS and WELLSIBS groups did not differ significantly in any characteristic. The sisters and brothers of ILLSIBS had various types of chronic conditions that included but were not limited to: asthma (n = 5), arthritis (n = 4), diabetes (n = 3), cancer (n = 2), epilepsy (n = 2), sickle cell disease (n = 2), thyroid (n = 2) and cardiac disorders (n = 2). In the WELLSIBS group, neither the participant, her index sibling, nor any other sibling in the household had a chronic health condition.

Measures

Information on age, gender, and illness status, as well as family structure, was assessed in the screening interview. The participant questionnaire provided data on ethnic background, socioeconomic status, and psychological distress. We used the Brief Symptom Inventory (BSI, Derogatis, 1993), a well-validated and reliable 53-item self-report scale that may be used with respondents as young as 13 years. Higher subscale scores indicate more symptoms. Raw scores also may be converted to standardized T scores, with values of 63 or greater considered a positive clinical diagnosis. The BSI assesses nine dimensions of psychopathology, but we selected only the anxiety, depression, hostility, and interpersonal sensitivity subscales for these analyses. These dimensions seemed appropriate because they reflect internalizing symptoms that were found to be problematic for sisters of siblings with chronic illness in other studies, and they were likely to have some variation in the sample. The other BSI subscales assess more severe clinical syndromes such as psychoticism and paranoid ideation, which have not been found to relate to sibling illness. The Global Severity Index (GSI) was used to measure overall symptom levels.

Data Analyses

To examine the first hypothesis, we used ANOVAs to compare mean BSI scores of ILLSIBS and WELL-SIBS. We also examined the proportions of each group having subscale scores above the clinical cut-off (T score ≥ 63). To test the second hypothesis, three-way MANOVA was conducted with the five BSI scores entered simultaneously as the dependent variables and sibling illness status, birth order, and gender entered as independent factors. We were particularly interested in determining whether there was a significant illness status × birth order interaction effect in this analysis. As noted, we expected a combined effect of these two variables such that older ILLSIBS would have significantly higher scores than other groups. Sibling gender had no hypothesized main or interaction effect but was included in the MANOVA as an additional control variable. All data were analyzed using SPSS/PC+, Version 5.0 (Norusis, 1992).

Results

ILLSIBS had comparatively higher mean BSI scores than WELLSIBS across the scales (Table I). Differences in means were statistically significant for the GSI, F(1, 66) = 5.0, p < .05, and for two of the four subscales: anxiety, F(1, 66) = 4.8, p < .05, and interpersonal sensitivity, F(1, 66) = 4.6, p < .05. Differences in the proportions of ILLSIBS and WELLSIBS above the clinical cut-off were significant only for interpersonal sensitivity (24% vs. 6%; χ²(1) = 4.22, p < .05). Differences between ILLSIBS and WELLSIBS did not reach significance at α = .05 for anxiety (21% vs. 9%), depression (24% vs. 9%), hostility (29% vs. 21%), or GSI (27% vs. 9%).

Three-way MANOVA confirmed the main effects of sibling illness status on mean BSI scores. As expected, there were no simple main effects for either sibling gender or birth order in this analysis. We also failed to detect either the significant illness status × birth order interaction we had hypothesized or any other two-way interaction among these vari-

<table>
<thead>
<tr>
<th>Subscales for Sisters of Adolescents With and Without Chronic Health Conditions</th>
<th>ILLSIBS M(±SD)</th>
<th>WELLSIBS M(±SD)</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety*</td>
<td>.92 (.89)</td>
<td>.51 (.64)</td>
<td>.51</td>
</tr>
<tr>
<td>Depression</td>
<td>1.11 (.99)</td>
<td>.71 (.87)</td>
<td>.42</td>
</tr>
<tr>
<td>Hostility</td>
<td>1.41 (1.09)</td>
<td>1.06 (1.05)</td>
<td>.38</td>
</tr>
<tr>
<td>Interpersonal sensitivity*</td>
<td>1.35 (1.11)</td>
<td>.82 (.93)</td>
<td>.50</td>
</tr>
<tr>
<td>Global severity index*</td>
<td>1.13 (.79)</td>
<td>.73 (.66)</td>
<td>.53</td>
</tr>
</tbody>
</table>

ILLSIBS are sisters of adolescents with chronic health conditions, WELLSIBS are sisters of adolescents without chronic health conditions; n = 34 in each group.

*p < .05.
GSI, F(1, 14) = 8.9, p < .01. In contrast, WELLISBS and ILLISBS who were older sisters of females did not differ significantly on any subscale.

Discussion

The first hypothesis, that healthy adolescent sisters of 13- to 19-year-old males and females with chronic conditions would have more symptoms of psychological distress than sisters of demographically similar adolescents without chronic conditions, generally was confirmed. Although differences between the groups were significant only for overall symptom severity, anxiety, and interpersonal sensitivity, the nonsignificant differences for depression and hostility scores were directionally consistent with our stated hypothesis. Moreover, the effect sizes ascertained were about .40–.50, which suggests that there may be moderate differences between the groups; differences this size would be significant at α = .05 and power = .80 if we doubled the sample size (Cohen, 1977). More sisters of siblings with conditions had scores above the clinical cut-offs, but these comparisons failed to achieve statistical significance because of the small sample size. Still, 21% to 24% of the ILLISBS had scores suggesting a likely positive diagnosis (i.e., T scores ≥ 63) for anxiety, depression, and interpersonal sensitivity compared with 9% or less of WELLISBS on the same subscales.

The second hypothesis, which suggested that an interaction between illness status and birth order would result in higher symptom scores among older sisters of adolescents with chronic conditions compared with all other groups, was not supported. Instead, there was an interesting three-way interaction of sibling illness status, birth order, and gender relating to anxiety, hostility, and overall symptom levels in this sample. An identical but nonsignificant pattern emerged for the depression and interpersonal sensitivity subscales. Thus, in contrast to our stated expectations, sibling gender was an important moderating factor, and older sisters of females with chronic conditions appeared to be comparatively less vulnerable to some types of psychopathology than other sisters of adolescents with conditions.

The potential risk factors and causal processes that influence distress may operate differently depending on sibling birth order, gender, or their combination. For example, traditional family roles and relationships might lead one to expect more household responsibilities and restrictions on personal activities among older sisters. This is particularly true for socioeconomically disadvantaged families, who may be highly stressed even in the absence of chronic illness. Indeed, the high scores demonstrated by older sisters of girls without chronic conditions may relate to negative feelings about such role-related expectations. However, older sisters of girls with conditions may see their

| Table II. Means of Selected Brief Symptom Index Subscales for Sisters of Adolescents With and Without Chronic Health Conditions by Birth Order and Sex of Index Adolescent |
|-----------------------------------|----------|----------|----------|----------|
| Birth order, sibling sex          | Older female (n = 18) | Older male (n = 16) | Younger female (n = 16) | Younger male (n = 18) |
| Anxiety*                         | WELLISBS  | .94      | 1.04     | 1.10     | .63      |
|                                  | ILLISBS   | .96      | .23      | .29      | .50      |
| Depression                       | WELLISBS  | 1.09     | 1.02     | 1.33     | 1.00     |
|                                  | ILLISBS   | 1.19     | .19      | .71      | .70      |
| Hostility*                       | WELLISBS  | .96      | 1.80     | 1.63     | 1.33     |
|                                  | ILLISBS   | 1.96     | .55      | .80      | .87      |
| Interpersonal sensitivity        | WELLISBS  | .97      | 1.53     | 1.53     | 1.39     |
|                                  | ILLISBS   | 1.39     | .28      | .75      | .78      |
| Global Severity Index*           | WELLISBS  | 1.01     | 1.21     | 1.24     | 1.08     |
|                                  | ILLISBS   | 1.29     | .25      | .64      | .69      |

*Age of participant relative to her sibling.
*p < .05 (3-way interaction).
course, onset, or functional impairment. Participants also were not asked if they agreed with the health status data provided by their brothers and sisters, and it is possible that some of them did not judge their siblings to have conditions. Finally, all of our participants were female. Clearly, research with larger, more diverse samples in studies that include family constellation and illness variables in addition to other personal, cultural, and environmental characteristics would help in establishing the generalizability of our findings and in identifying factors that account for sibling differences.

In summary, our findings support the contention that despite an increased risk, adverse effects on adolescents’ psychological functioning are not inevitable given the presence of a sibling with a chronic health condition (Thompson & Gustafson, 1996; Williams, 1997). The specific elevations we detected suggest that distress is more likely to be manifested as feelings of tension, depressed affect, and self-doubt during interpersonal interactions, than as angry thoughts or actions. This is consistent with the literature and may be related in part to increased social isolation, but only further research will determine more specifically both when and how adjustment may be affected in this manner. Despite its limitations, our study adds further support to previous research, which also found that birth order and gender may raise or lower risks (Howe, 1993; Williams, 1997). Thus, these factors and this study’s methodology should be considered by researchers and by clinicians in evaluating the likelihood of psychological distress and in planning potential mental health interventions for healthy adolescents whose siblings have chronic conditions.

Acknowledgments

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References


