Health Care Utilization and Health Status in High-risk Children Randomized to Receive Group or Individual Well Child Care

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ABSTRACT. Objective. To determine if health care utilization and health status among high-risk children is modified by the use of group well child care (GWCC) as compared with traditional one-to-one individual well child care (IWCC).

Study Design. Randomized controlled trial.

Participants. Children less than 4 months old from families with at least one of the following maternal risk factors: poverty, single marital status, age <20 years at delivery, less than a high school education, previous substance abuse, or history of abuse as a child.


Interventions. Children were randomized to receive GWCC or IWCC at the time of enrollment. Health supervision visits with two study nurse practitioners were scheduled at 4, 5, 6, 8, 10, 12, and 15 months of age. GWCC study visits consisted of a group discussion of age-appropriate child-rearing issues, along with a physical examination, health screening, and immunizations. Health care utilization among children receiving GWCC and those randomized to IWCC was assessed using the following measures: compliance with study visits, compliance with any age-appropriate health supervision visit, emergency department utilization, and immunization rates (defined as the proportion of children in each group who had received all recommended vaccines by 1 year of age). Provider time for GWCC and IWCC study visits was also recorded. Health status was measured using Stein’s Functional Status IIR, completed by the mothers of study patients when their children completed the study at 15 months of age.

Results. A total of 106 children received GWCC, whereas 104 were randomized to IWCC. Compliance with scheduled study visits was 47% for GWCC patients and 54% for IWCC recipients; overall compliance with any age-appropriate health supervision visit was 68% and 66%, respectively. Provider time was similar for GWCC and IWCC visits. By the age of 1 year, 67% of GWCC recipients and 73% of those receiving IWCC had received three DTP/DT, three OPV/IPV, three Hib, and three hepatitis B immunizations. A total of 242 emergency department visits were made by study patients during their enrollment in the project; there was no difference in the average number of visits between GWCC or IWCC children. However, children receiving IWCC were more likely to have at least one emergency department visit than GWCC recipients. At the conclusion of the project, health status, as measured by the Functional Status IIR, was similar in GWCC and IWCC patients (mean scores 92.4 ± 1.4 and 92.5 ± 1.1, respectively).

Conclusions. Health care utilization and health status was similar in high-risk children whether they received GWCC or IWCC. GWCC is a viable format for health supervision visits in this population. Pediatrics 1997;100(3). URL: http://www.pediatrics.org/cgi/content/full/100/3/e1; well child care, health status, immunizations, Functional Status IIR, health status, health care utilization.

ABBREVIATIONS. ED, emergency department; GWCC, group well child care; IWCC, individual well child care; FSIIIR, Functional Status IIR.

The primary goal of well child care is prevention, which is primarily achieved through immunizations, physical examinations, screening, and parental education. Benchmarks of optimal well child care include improved health status and effective health care utilization, with high usage of preventive services such as immunizations and low use of preventable tertiary health care such as is provided in the emergency department (ED). It is crucial to evaluate critically the impact of different techniques of well child care on these outcomes. This is particularly true for socially disadvantaged children in whom reported utilization of preventive services is lower and ED use higher than in middle-class populations.1–4

Compared with individually administered well child care (IWCC), group well child care (GWCC) has the potential to promote better health care utilization and improved health status. With GWCC, the health care provider leads a discussion of child-rearing issues among a group of parents of similarly aged children followed by individual examinations and immunizations. Unlike the traditional one-to-one health supervision visit, in which often there is little time available for discussion of parenting and prevention issues, the GWCC format is specifically designed to facilitate parental education.5–8 Compared with individual well child care (IWCC), GWCC enhances delivery of information on topics such as safety, nutrition, and infant behavior.9

Another potential advantage of GWCC for high-risk families is the possibility that the group sessions could function as a support group for the parents. In a controlled trial among parents of premature in-

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fants, a family support system resulted in decreased use of ED services as well as inpatient admissions.\textsuperscript{10} In sharing their concerns and experiences, parents may share information about additional resources and strategies that have been helpful to them. GWCC may also be more enjoyable and personally rewarding to families than IWCC, leading to enhanced compliance with scheduled visits.

Although GWCC has been shown to increase the amount of time spent on child-rearing issues,\textsuperscript{9} there has been, to our knowledge, little investigation as to whether this leads to better health outcomes. We conducted a study comparing GWCC and IWCC among high-risk urban families. Before beginning the project, we postulated that children receiving GWCC would have better compliance with well child care visits, increased immunization rates, fewer ED visits, and improved health status than patients who received traditional one-to-one health supervision.

**METHODS**

A randomized controlled trial comparing GWCC and IWCC was conducted between March 1993 and February 1996. The details of the project have been previously described.\textsuperscript{11} Briefly, high-risk infants were recruited for the study from two urban pediatric clinics at the University of Washington. Infants were enrolled before the age of 4 months, and were eligible for the project if their mothers had at least one of the following risk factors: single marital status, education level less than completion of high school, participation in Medicaid (as a proxy for poverty), age less than 20 years at delivery, previous substance abuse, or history of abuse as a child. Children were excluded if their parents were non-English speaking, the primary caregiver was not a biologic parent, an older sibling received primary care from another provider, or there was a serious ongoing medical condition.

Infants were randomized at enrollment to receive either GWCC or IWCC by one of two study nurse practitioners. The mothers of study children completed several previously validated questionnaires assessing social support, parental sense of competency and isolation, chronic family stress, maternal substance abuse, depression, and history of abuse as a child.\textsuperscript{12-18} In addition, baseline data on maternal demographic characteristics were collected.

Study health supervision visits were scheduled at 4, 5, 6, 8, 10, 12, and 15 months of age. The timing of well child care visits corresponded to the schedule used at our clinics for other programs for high-risk families. At each visit, for both IWCC and GWCC patients, the study nurse practitioner reviewed curricula of topics to be discussed that was developed before beginning the project. Children randomized to IWCC received traditional one-to-one health supervision visits. Patients randomized to GWCC were assigned to a cohort of infants with birthdays within 2 months of each other. Group health supervision visits consisted of a discussion of age-appropriate child-rearing issues, led by a nurse practitioner. Each child received a brief physical examination before or after the group session. Immunizations and health screening were provided to all study children regardless of assignment to GWCC or IWCC.

Study outcomes included three measures of health care utilization—compliance with health supervision visits, immunization status, and ED utilization—as well as a measurement of health status. Compliance with health supervision visits was measured in two ways. First, all patients were given appointments for specific study well child care visits. The proportion of these appointments kept was categorized as study-visit compliance. If a child was a no show for a study visit, the parent was telephoned and another appointment for health supervision made. All rescheduled well child care visits were individual visits, regardless of initial assignment to GWCC or IWCC. Overall compliance was classified as the proportion of age-appropriate well child care visits accomplished (combining study visits and rescheduled appointments). During the 11-month study period, some families of study children moved out of the area; once a child had moved, no more compliance figures were kept.

To measure immunization rates, medical records of study patients were reviewed, and the dates of all vaccinations abstracted. A child was considered to be fully immunized if he or she had received three DTP/DT, two OPV/IPV, three hepatitis B, and three Hib vaccines before the age of 12 months. This interim outcome measure was considered because the study concluded at 15 months of age, before all of the recommended primary immunizations would have occurred.

ED visits were monitored by reviewing medical records and computerized ED logs at Harborview Medical Center, the University of Washington Medical Center and Children’s Hospital and Medical Center. These hospitals are where patients seen at the two study clinic sites routinely receive ED care. Visits by patients to other EDs were not recorded.

Health status was measured using the 14-item version of Stein’s Functional Status IIR (FSIIR).\textsuperscript{19} This instrument was completed by the mothers of study patients when their children completed the project at 15 months of age. The 14-item version of the FSIIR consists of a core of behavioral items, consistent with a healthy child, that are applicable to all age groups. The FSIIR score is the percentage of possible points that a child obtains. In a sample of 732 children, with a mixture of well and ill children, the mean FSIIR score for the well children was 96.1 ± 8.2 vs 86.8 ± 15.7 for those who were ill.\textsuperscript{19}

Provider time was measured for all study visits. For children receiving IWCC, provider time was defined as the number of minutes spent in the examination room by the nurse practitioner. For GWCC patients, provider time was the sum of minutes spent in the group discussion session/number of children at the session, and the time spent examining the child.

An intention-to-treat design was used to analyze the data. With this schema, once a child was randomized to IWCC to GWCC, the outcome measures were collected and analyzed regardless of how many study visits were accomplished. Exceptions to this analysis plan were made for parents who declined participation in the project after initially signing the informed consent, and for children who were removed from the home because of abuse and/or neglect. Data on these patients were excluded from the analysis. There were 20 study families who moved out of King County, Washington (where the study clinics are located) during the project. Data on these children were collected until the family moved. Immunization status was assessed for 13 of these 20 patients; 7 infants were excluded from the assessment of immunization status because they moved before the age of 6 months, when the third set of vaccines would be given. Finally, 16 children changed health care providers during the study period. Although the switch in providers was usually prompted by changing insurance coverage or transportation issues, it is possible that dissatisfaction with the type of well child care provided in the study motivated the family to seek out a new provider. Thus, data on these patients were analyzed as if the child remained in the project for the entire study period.

To evaluate differences between methods of providing well child care, the FSIIR results of children receiving GWCC or IWCC were compared with the use of \( t \) tests. The proportion of fully immunized children in each group was assessed with \( \chi^2 \) tests. The association between ED usage and method of well child care was evaluated with the use of linear regression, after controlling for the number of months that a child remained in the study. A logarithmic transformation of the number of ED visits was performed to account for the skewed nature of the data (most patients had zero or one visit). Logistic regression was used to assess whether either IWCC or GWCC was associated with a child having no ED visits. Finally, differences in provider time and compliance between patients assigned to GWCC and those randomized to receive IWCC were assessed using Generalized Estimating Equations. Results were considered to be statistically significant when the \( P \) value was < .05.

The study was approved by the Institutional Review Board of Children’s Hospital and Medical Center, Seattle, Washington. Signed informed consent was obtained.

**RESULTS**

A total of 220 children were enrolled in the project; 111 were randomized to GWCC and 109 to IWCC.
Data were excluded on seven children whose parents declined participation after initially signing the informed consent; three of these were randomized to GWCC and four to IWCC. Also excluded from the analysis were data on three patients (two GWCC and one IWCC) who were removed from the home because of abuse or neglect during the study period. Thus, the results of the study were based on data on 210 children, including 106 who received GWCC and 104 randomized to IWCC.

Intake questionnaires were completed at baseline by the mothers of 185 of the 210 study children (88%); results are summarized in Table 1. Overall, a high-risk population was enrolled; one-third of the mothers of study patients had not completed high school, two-thirds were unmarried, and almost 50% had household incomes less than $500 per month. Significant proportions of women had positive screens for substance abuse, depression, history of abuse, and poor parent reporting confidence. Mothers of children randomized to GWCC were similar to those of IWCC recipients for most baseline characteristics. However, positive screens for drug abuse were more common in mothers of GWCC patients ($P = .05$).

The 106 children randomized to GWCC were organized into 18 cohorts based on their birthdays. The mean group size was 6.0 ± 2.2 children (range, 2 to 10); mean attendance at group sessions was 2.3 ± 1.8 (range, 0 to 10).

Study outcomes are presented in Table 2. As can be seen in Table 2, of the 690 scheduled GWCC study visits, appointments were kept 47% of the time, whereas compliance with scheduled IWCC study visits was 54% ($P = .14$). Provider time needed for GWCC and IWCC study visits was similar (mean length 19.0 ± 7.1 and 20.0 ± 8.6 minutes, respectively; $P = .38$). Attempts were made to reschedule all missed visits. At rescheduled visits, care was provided using an individual care format regardless of assignment to GWCC or IWCC. Overall compliance with any age-appropriate health supervision (either study or rescheduled visit) was 68% for GWCC patients and 66% for those receiving IWCC ($P = .48$).

Immunization data were analyzed on 203 patients; 67.0% of GWCC recipients and 73.0% of children randomized to IWCC received three DTP/DT, two OPV/IPV, three hepatitis B, and three Hib vaccines before their first birthday ($P = .35$). Much of the underimmunization was attributable to failure to receive all recommended doses of hepatitis B and/or Hib. When defined as receiving three DTP/DT, and two OPV/IPV before the age of 1 year, 84.5% of GWCC and 87.0% of IWCC patients were fully immunized ($P = .61$).

A review of ED records disclosed that the 210 patients made a total of 242 visits during the project (Fig 1). As is shown in Fig 1, most children had 0 or 1 visit, whereas a small number had up to 11 visits between enrollment and the age of 15 months. There was no significant difference in ED usage between patients randomized to GWCC or IWCC ($P = .35$). However, a significantly higher proportion of children randomized to IWCC had at least one ED visit than GWCC patients ($P = .02$, using logistic regression after adjustment for number of months in the study).

Mothers of 151 patients completed the FSIIR measurement assessing health status at study comple-

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**TABLE 1.** Baseline Characteristics of Mothers of Study Children

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>GWCC* (n = 92)</th>
<th>IWCC* (n = 93)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age &lt;20</td>
<td>22.5</td>
<td>25.0</td>
</tr>
<tr>
<td>20 to 30</td>
<td>60.7</td>
<td>55.4</td>
</tr>
<tr>
<td>30+</td>
<td>16.9</td>
<td>19.6</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;10th grade</td>
<td>15.4</td>
<td>10.0</td>
</tr>
<tr>
<td>10th to 11th grade</td>
<td>20.9</td>
<td>18.9</td>
</tr>
<tr>
<td>High school graduate</td>
<td>27.5</td>
<td>34.4</td>
</tr>
<tr>
<td>Beyond high school</td>
<td>36.3</td>
<td>36.7</td>
</tr>
<tr>
<td>Monthly Household Income</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;$500</td>
<td>46.3</td>
<td>42.7</td>
</tr>
<tr>
<td>$500 to $999</td>
<td>33.8</td>
<td>35.4</td>
</tr>
<tr>
<td>$1000 or more</td>
<td>20.0</td>
<td>22.0</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>31.5</td>
<td>28.0</td>
</tr>
<tr>
<td>Black</td>
<td>41.3</td>
<td>44.1</td>
</tr>
<tr>
<td>Other</td>
<td>27.2</td>
<td>28.0</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>33.7</td>
<td>31.5</td>
</tr>
<tr>
<td>Single, divorced, separated, other</td>
<td>66.3</td>
<td>68.5</td>
</tr>
<tr>
<td>Positive alcohol screen</td>
<td>9.9</td>
<td>3.2</td>
</tr>
<tr>
<td>Positive drug screen</td>
<td>18.9</td>
<td>8.8</td>
</tr>
<tr>
<td>Positive depression screen</td>
<td>31.5</td>
<td>43.0</td>
</tr>
<tr>
<td>Physical abuse as child</td>
<td>17.6</td>
<td>13.0</td>
</tr>
<tr>
<td>Neglected as child</td>
<td>18.9</td>
<td>10.9</td>
</tr>
<tr>
<td>Sexually abused as child</td>
<td>18.9</td>
<td>17.2</td>
</tr>
<tr>
<td>Stressful life circumstances</td>
<td>31.9</td>
<td>27.5</td>
</tr>
<tr>
<td>Low social support</td>
<td>68.5</td>
<td>60.2</td>
</tr>
<tr>
<td>High risk for feelings of poor competency as a parent</td>
<td>10.9</td>
<td>12.0</td>
</tr>
<tr>
<td>High risk for feelings of isolation as a parent</td>
<td>27.2</td>
<td>26.1</td>
</tr>
</tbody>
</table>

*All values are percentages. GWCC indicates group well child care; IWCC, individual well child care.

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**TABLE 2.** Comparison of Study Outcomes in Children Randomized to Group Well Child Care (GWCC) or Individual Well Child Care (IWCC)

<table>
<thead>
<tr>
<th>Outcome</th>
<th>GWCC (n = 106)*</th>
<th>IWCC (n = 104)*</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compliance with study visits</td>
<td>47%</td>
<td>54%</td>
<td>.14†</td>
</tr>
<tr>
<td>Mean provider time for study visits (minutes)</td>
<td>19.0 ± 7.1</td>
<td>20.0 ± 8.6</td>
<td>.38‡</td>
</tr>
<tr>
<td>Fully immunized at 12 months of age</td>
<td>67.0%</td>
<td>73.0%</td>
<td>.35</td>
</tr>
<tr>
<td>Mean number of ED visits</td>
<td>1.12 ± 1.98</td>
<td>1.18 ± 1.62</td>
<td>.35‡</td>
</tr>
<tr>
<td>FSIIR mean score</td>
<td>92.4 ± 1.4</td>
<td>92.5 ± 1.1</td>
<td>.97</td>
</tr>
</tbody>
</table>

* n Represents total number of children assigned to GWCC or IWCC. Immunization data based on 103 GWCC and 100 IWCC patients. FSIIR data based on 78 GWCC and 73 IWCC patients.
† Calculated with the use of Generalized Estimating Equations.
‡ After controlling for number of months that children remained in the study.

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http://www.pediatrics.org/cgi/content/full/100/3/1
Among GWCC children the mean score was 92.4 ± 1.4; for those randomized to IWCC the mean score was 92.5 ± 1.1 (P = .97).

**DISCUSSION**

For the outcomes measured in this study, there were no differences in health status or utilization between high-risk infants receiving GWCC and those receiving traditional IWCC. GWCC patients were less likely than those receiving IWCC to have no ED visits; however, total ED use was the same in both groups. Study and overall health supervision compliance, immunization rates, and health status were similar in children receiving GWCC and those randomized to IWCC. Finally, the provider time per patient required for the two well child care formats was virtually identical. Before beginning the project, we postulated that the group sessions would function as a support group for the parents. Unfortunately, the relatively small group sizes combined with a show rate of less than 50% resulted in the average group session consisting of fewer than three study children. It might have been advantageous if we had planned for larger groups at the outset of the project. However, to accomplish this it would have been necessary to either include infants who were greater than 2 months apart in age in the same group, thus making discussion of age-specific issues difficult; enroll non-English-speaking families; or deprive pediatric residents the opportunity to pick up new patients. GWCC might be more feasible in non-teaching settings in which large numbers of high-risk children are seen.

Previous research in middle-class populations has shown that GWCC leads to increased parental knowledge for a variety of child-rearing issues. It was designed to measure functional outcomes, we did not compare changes in parental knowledge or attitudes. However, any increases in parental knowledge regarding child health that might have occurred because of the GWCC format were not accompanied by better immunization status or decreases in ED utilization. It is possible that our measurements of health care utilization were too crude to reveal any differences, or that changes in health care utilization might become more apparent at a later age. However, previous research has shown that patterns of medical care use are established early in a child’s life.

Although we were unable to document specific benefits, our data suggest that there are no deleterious consequences of utilizing the group format for the provision of well child care to high-risk children. Providers wishing to use GWCC should be reassured by our results demonstrating that health care utilization and status of children receiving group care are at least as good as those outcomes among IWCC recipients. GWCC might be an attractive option for health supervision in settings in which large numbers of infants receive care. With larger groups, the provider time per patient would most likely decrease whereas the opportunity for peer support would be enhanced.

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**REFERENCES**

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