Objective. This study examined the long-term effect of an early prevention program on mothers' knowledge, attitudes, and practices with regard to their children's development. The prevention program focused on increasing the mothers' sensitivity to their children's needs and their awareness of the importance of their role in their children's early development.

Method. Fifty-five mothers and their infants received approximately 5 hours of intervention once every 8 weeks during the infants' first year of life. A control group of 54 mothers and their infants did not receive the intervention. Subjects' knowledge of their children's sensory, motor, and language abilities; their beliefs in their ability to influence their children's development; and an indication of whether they implemented their knowledge were all measured with the Knowledge, Attitude, and Practices Questionnaire (KAP) 1.5 years to 2 years after completion of the prevention program.

Results. KAP scores of the intervention group were higher than the scores of the control group, suggesting that the prevention program helped mothers acquire greater knowledge and more appropriate attitudes and practices about child development.

Conclusion. This study supports the theory that the effect of a primary prevention program during the first year of a child's life can be sustained for 1 year to 2 years.

In the past two decades, programs designed to improve maternal competence have been advocated and implemented as a form of early prevention. In Israel (Parush, Lapidot, Edelstein, & Tamir, 1987) as well as in the United States (Anderson & Hinojosa, 1984; Burke, Clark, Hamilton-Dodd, & Kawamoto, 1987; Day, 1982; Friedman, 1982; Schaaf & Mulrooney, 1989), occupational therapists and other health professionals developed collaborative relationships with families in order to promote and maintain health. Examples of community-based early prevention programs in occupational therapy with a healthy population of infants and mothers include the Maternal Role Preparation program, which was designed to increase maternal competence in first-time mothers (Burke et al., 1987), and the Developmental Enrichment Clinic, which was established to teach parents about child development and enrichment (Atchison & Nasser, 1989).

Mothering can be described as instinctual and learned. Instinctual mothering provides a repertoire of actions and responses that are naturally mediated. This kind of motherly behavior is used at all times in mother–child interac-
tions. Learned mothering occurs as the mother gains knowledge about child development (Burke et al., 1987; Dunst & Trivette, 1988). Such knowledge is gained, first and foremost, from modeling one's own mother's behaviors. It also is gained through dynamic involvement with the child, reading literature on child development, attending mothers’ groups, or engaging in activities with the child together with an adult more experienced in child rearing. However, the evolution of this type of mothering depends on the mother's drive to broaden her knowledge of parenting (Atchison & Nasser, 1989) and her awareness that knowledge should be acquired for optimal parenting. When the mother is unaware of the need to have this knowledge, unmotivated to acquire this knowledge, or both, she needs to be encouraged and motivated by an outside influence. This article describes the long-term effect of a prevention program designed by occupational therapists to enhance learned mothering (Parush et al., 1987) 1.5 years to 2 years after the program ended. Specific questions addressed included:

1. Do mothers who participated in the prevention program demonstrate more knowledge about child development than comparable mothers who were not enrolled in the program?

2. Do the mothers who participated in the prevention program have a firmer belief in their capability of enriching their children's development than comparable mothers who were not enrolled in the program?

3. Do the mothers who participated in the prevention program implement their knowledge in practice more than comparable mothers who were not enrolled in the program?

4. Do the demographic variables, the prevention program, or both predict mothers’ knowledge, attitudes, and practices?

**Method**

**Subjects**

Subjects were 109 mothers of 3-year-old to 3.5-year-old children who were typically developing. All subjects were from lower class neighborhoods and were seen at Mother and Child Health Care (MCHC) centers in Jerusalem, Israel. In the MCHC centers, nurses and pediatricians address the family's needs in different medical, nutritional, and social areas, whereas occupational therapists are involved in guiding mothers in meeting their infants' developmental needs in order to promote optimal development.

The study population was drawn randomly from six sociodemographically comparable MCHC centers, three of which offered the prevention program implemented by an occupational therapist (intervention group: \( n = 55 \)) and three of which offered no prevention program (control group: \( n = 54 \)). All subjects in both groups spoke, read, and wrote Hebrew on at least a 6th-grade level, and none, according to the nurses' evaluation, were mentally retarded or mentally ill or had sensory loss (i.e., blindness, deafness). According to medical charts at the centers, all infants in both groups were without disability and healthy and had been born within the same 3-month period. Demographic variables of the study sample are shown in Table 1.

The MCHC centers were chosen to house our prevention program because in Israel, public health services for babies are used by the total population. The public health nurse at the MCHC center gives babies inoculations (five times in the first year and at appropriate intervals thereafter) rather than the family physician or the pediatrician. The nurse weighs and measures the babies for height and head circumference twice a month for the first 3 months of life and then at 6, 12, 24, and 36 months. The nurse also gives nutrition advice for the babies. The MCHC pediatrician performs a developmental checkup at 3, 6, 9, 18, 36, and 60 months.

**Intervention**

The prevention program was designed to emphasize the value of appropriate sensory experiences for the infant in the first months of life and to enhance the mother's skills as mediator of her child's environment (Parush, Lapidot, & Tamir, 1986). To facilitate learned mothering, the prevention program involved three stages:

1. Subjects were encouraged to see themselves as having the potential to qualitatively influence their child's development.

2. Subjects were given detailed information of their child's sensory (Ayres, 1972, 1979), perceptual-motor (Creppy, 1981), and cognitive development (Harris, 1983; Lapidot, Parush, & Tamir, 1987).

3. Subjects were shown how to enhance development through modeling techniques. This was done by explaining the child's performance to the subject (after an interaction between the two was observed) and suggesting ways for enhancing the quantity, quality, and variety of sensory, perceptual-motor, and cognitive experiences. Special emphasis was given to the subject's correct understanding and perception of her child's needs.

The sessions were held once every 8 weeks during the first year of the child's life and were individually based. They involved the mother, infant, and therapist and took approximately 20 min to 30 min to complete. The activi-
Table 1
Demographic Variables of Subjects

<table>
<thead>
<tr>
<th>Variable</th>
<th>Control Group</th>
<th>Intervention Group</th>
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<tbody>
<tr>
<td>Average age</td>
<td>M 31.37, SD 6.01</td>
<td>M 31.27, SD 5.03</td>
</tr>
<tr>
<td>Number of children in family</td>
<td>M 2.75, SD 1.51</td>
<td>M 2.72, SD 1.45</td>
</tr>
<tr>
<td>Ordinal position of child in family</td>
<td>First 19, Other 35</td>
<td>First 17, Other 38</td>
</tr>
</tbody>
</table>

\(n = 54\), \(n = 55\).

ties included sensory stimulation, such as cuddling, rocking, and visual tracking; motor activities, such as crawling and climbing; and hand manipulation functions, such as eye–hand coordination and pincer grasp. In addition, special emphasis was placed on the child’s attention span and cognitive functions, such as word formulation, establishing form constancy, and understanding cause and effect. Each subject completed six or seven full sessions. Fathers did not participate in the program because they generally do not visit the MCHC centers.

**Instrument**

The Knowledge, Attitude, and Practices Questionnaire (KAP) used in an earlier study to measure the immediate impact of the intervention program on the subjects’ knowledge, attitudes, and practices (Parush et al., 1987) was adapted for the current study. Questions were added mostly to the Practice Section of the three-part questionnaire to be appropriate for mothers of 3-year-old children instead of 1.5-year-old children.

The three-part questionnaire consists of the Knowledge Section (21 multiple-choice questions that assess the mother’s knowledge of the child’s sensory, motor, and language developmental capabilities), the Attitude Section (21 statements that assess the mother’s belief in her ability to influence her child’s development), and the Practice Section (22 questions that assess whether the mother applied her knowledge). Scores are obtained for the Knowledge and Practice Sections by summing up the number of correct responses and for the Attitude Section by summing up the respective weighted scores: strongly agree = +2, disagree = −1, neutral = 0, agree = +1, and strongly agree = +2.

To evaluate clarity and style of the revised KAP, it was administered to four mothers attending an MCHC center who did not participate in the study. On the basis of their comments, the wording in some questions was changed.

To establish construct validity of the revised KAP, the known group procedure (Benson & Clark, 1982) was used with 2 groups of 10 mothers with 3-year-old children. These 20 mothers were not included in the research sample. The mothers in the higher socioeconomic neighborhood group had 13 or more years of formal education, and the mothers in the lower socioeconomic neighborhood group had 10 or fewer years of formal education. Educational level was chosen as the discriminating variable between the groups because mothers with higher education have been found to have a greater awareness and knowledge of child development (Cleaver, 1994; Tulkin & Kagan, 1972).

Significant difference between the two groups on the three parts of the revised KAP were revealed through t-test analyses for construct validity: knowledge, \(t = 10.8, p < .01\); attitude, \(t = 2.35, p < .02\); and practice, \(t = 3.48, p < .05\). The mothers with more years of formal education had better scores than those with fewer years. These results reflect that the revised KAP can, to a degree, discriminate between differences in mothers’ knowledge about child development and their attitudes toward their role in enriching their child’s development and implementing their knowledge and attitude in practice.

**Procedure**

One and a half years after the prevention program ended, all 109 subjects were asked to complete the revised KAP during a home visit. Completion took approximately 30 min.

**Data Analysis**

To identify significance between groups for sociodemographic variables, student t tests (for continuous variables) and chi-squares (for ordinal variables) were calculated. In addition, student t tests were performed to analyze the differences between intervention and control groups on the KAP. A significance level of \(p < .05\) (two tailed) was used.

**Results**

**Description of the Sample**

There were no significant differences between the subjects in the intervention group and those in the control group in the number of children in the family, \(t = .11, df = 107, p = .91\); in the ordinal position of the child in the family, \(\chi^2(1) = .23, p = .64\); in subjects’ mean age, \(t = .99, df = 107, p = .33\); and in subjects’ years of education, \(\chi^2(3) = .10, p = .99\). The intervention group had significantly
higher mean scores (knowledge = 15.20, attitude = 29.18, practice = 35.24) than the control group (knowledge = 10.96, attitude = 7.04, practice = 28.40) on each section of the KAP: knowledge, \( t = 6.59, p = .000 \); attitude, \( t = -14.00, p = .000 \); and practice, \( t = -6.30, p = .000 \).

Two-way analyses of variance (ANOVAs) were performed to examine whether the findings persisted across number of years of education, number of children in the family, and the ordinal position of the child in the family. These analyses revealed that number of years of education had a significant main effect only on subjects' knowledge of child development, \( F = 5.21, p = .002 \), and not on their attitudes and practices. Number of years of education also had a significant interaction with the intervention, \( F = 4.83, p = .003 \). Because significant interaction was found between the intervention and years of education, a second ANOVA was performed on each group separately. Number of years of education had a significant effect only on the control group's knowledge, \( F = 8.87, p = .0001 \). In fact, Tukey's post-hoc comparison revealed that control group subjects with 9 to 10 years of education differed significantly from those with 11 or more years of education (i.e., the latter had more knowledge of child development). In contrast, number of years of education had no significant effect on the intervention group's knowledge of child development, \( F = .02, p = .996 \).

The number of children in the family had a significant effect only on the KAP practice scores, \( F = 8.28, p = .000 \), but did not interact with the intervention. In fact, Tukey's post-hoc comparison revealed that practice scores of subjects with four or more children differed significantly from practice scores of subjects with fewer children (i.e., their scores were lower; see Table 2). Whether the child was the family's firstborn had no significant effect on the KAP scores and did not interact with the intervention, \( p > .10 \).

To determine the predictability of both the prevention program and the demographic variables on subjects' knowledge, attitudes, and practices, stepwise multiple regressions were performed. Of the sociodemographic variables, only years of formal education and number of children in the family were included because only these were found to have significant effects on the dependent variables.

Results of the KAP showed that the intervention was the best predictor of subjects' knowledge about child development (29% of the variance), belief in their capability to nurture their child (64.7% of the variance), and ability to apply knowledge practically (27% of the variance). Number of years of education was the next best predictor for knowledge (4% of the variance) and attitude (1.3% of the variance), and number of children in the family was the next best predictor for practice (11.5% of the variance). These findings support the efficacy of our prevention program, which is described elsewhere (Parush et al., 1987).

### Discussion

Results of the present study demonstrate that the intervention program that consists of information-giving (to heighten knowledge and strengthen attitudes) and modeling (to increase appropriate practice) techniques enriched subjects with greater knowledge about child development. They also indicate that the subjects demonstrated stronger convictions that the human and physical environment can influence the quality of the child's development than did the control subjects. The present study is a follow-up to the investigation conducted immediately after the prevention program (Parush et al., 1987), and the positive findings demonstrate that the prevention program maintained its effect for up to 2 years after the end of the intervention. The results of this study concur with Klein and Alony's (1993) findings that maternal mediating behaviors can be modified and that this maternal change is maintained over time.

Despite Parush and Clark's (1988) finding that more years of formal education is associated with more knowledge on topics about child development, the intervention group in this follow-up study had the same average scores on the KAP. This suggests that the prevention program contributed to the subjects' knowledge about child development, regardless of number of years of formal education, thus minimizing the effect of formal education. This effect was noted in the control group and has been described in the literature (Tulkin & Kagan, 1972).

Although the finding that number of children in the family did not appear to influence subjects' knowledge and attitudes, the time available to subjects with more than four children to apply their knowledge may have been more limited than time available to those with four or fewer children. A challenging task for occupational therapists could be in designing time-management techniques for mothers of more than four children to afford them more time to use their skills with their infants. Thus, the heightened knowledge, attitudes, and practices

<table>
<thead>
<tr>
<th>Number of Children in Family</th>
<th>Control</th>
<th>Intervention</th>
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<tbody>
<tr>
<td>1</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>2-3</td>
<td>35</td>
<td>42</td>
</tr>
<tr>
<td>4</td>
<td>11</td>
<td>8</td>
</tr>
</tbody>
</table>

Note. KAP = Knowledge, Attitude, and Practices Questionnaire.
pertaining to development that the subjects in the intervention group gained empirically support beliefs that occupational therapy services can contribute to primary prevention (Atchison & Nasser, 1989; Benzing & Strickland, 1983; Burke et al., 1987; Schaaf & Gitlin, 1989). Providing knowledge, supporting or changing attitudes about the role of environmental nurturance of a child’s well-being, and mediating the positive practice of mothering all can be regarded as primary prevention aspects of occupational therapy pediatric services.

Limitations

Several limitations existed in this study. First, generalization of this intervention program to other cultures is limited because it reflects an intervention located in Israeli MCHC centers. Such a program could be replicated only in a center where mothers’ attendance is high. Second, other variables that could affect mothers’ knowledge, attitudes, and practices with regard to development, such as media, social influence, and grandmothers’ influence, were not taken into account. Third, the sample size of both groups was small. Finally, the efficacy of the prevention program was not tested by conducting a direct evaluation of the children’s development.

Directions for Future Research

Further research is recommended to assess developmental outcomes in the children whose mothers participated in the prevention program. These children could be reassessed before entrance into the 1st grade in order to evaluate the influence of the prevention program on academic achievement. In addition, it would be enlightening to include fathers in the prevention program and to obtain their responses on the KAP in order to determine whether they would benefit from the program.

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