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What is This?
The Effects of Camp on Health-Related Quality of Life in Children With Chronic Illnesses: A Review of the Literature

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Chronic illness in children may negatively affect aspects of their health-related quality of life (HRQL). Over many years, camps have been organized to address the physical and psychosocial needs of children with various chronic illnesses, while providing a “normal” as possible camp experience. The aim of this study was to critically review all research examining the effect of camps on HRQL in children with chronic illnesses. The literature review yielded no randomized, controlled clinical trials; 8 pretest-posttest study designs with repeated measures; 9 pre-post studies; and 1 survey design. A total of 1270 children, ranging in age from 6 to 25 years, participated in the studies.

Key words: camp, child, quality of life, chronic illness

Chronic illness in children negatively affects aspects of their health-related quality of life (HRQL). Epidemiological surveys show that 10% to 20% of children in Western developed countries have a chronic illness (Wallander & Varni, 1998). Children with chronic illness and their families experience stress that leaves them at risk of developing long-term physical, emotional, and psychosocial problems (Heiney, Wells, & Coleman, 1990; Houtzager, Grootenhuis, & Last, 1999).

As more children survive illnesses rather than die from them, they receive care not only in the hospital but also in other places such as the home and community. Most children with chronic illness are not allowed to register for traditional summer camp because of their need for closer medical supervision or because they are physically unable to participate in camp activities (Sawin, Lannon, & Austin, 2001). Camps are often defined as therapeutic recreation in which purposeful interventions are designed to improve the participants’ quality of life through recreation and leisure and where the provision of medical treatments for chronic illnesses are provided by competent health care professionals (Jamison, Lewis, & Burish, 1986). These camps may have a therapeutic effect and improve HRQL.

HRQL is an important outcome measure in research on pediatric chronic illnesses, however it is poorly understood. Although consensus has yet to be reached on a quality of life (QOL) definition, the most commonly used is one by the World Health Organization. QOL is a broad multidimensional concept that focuses on the individual’s perception of their position in life, in the context of culture and value systems in which they live and in relation to their goals, expectations, standards and concerns (World Health Organization, 1993). The most common domains of QOL are those that encompass physical, psychological, social, role functioning,
and spiritual issues. In addition, it is recommended that QOL measures for children should also include cognitive functioning, autonomy, body image, and family relationships (Eiser & Morse, 2001). However, in the health care context, treatments may not influence QOL but focus narrowly on medical complaints (Feeny, Furlong, Mulhern, Barr, & Hudson, 1999). Therefore, the term health-related quality of life, which is the more restricted concept of QOL, is more appropriately used in the context of the health care system. HRQL refers to the subjective and objective impact of dysfunction on the physical, psychological, and social aspects of QOL that are influenced by an individual’s disease and its treatment (Strand & Russell, 1997).

In the past 2 decades, empirical studies have emerged reporting the effects of camp on aspects of HRQL in children with chronic illness. Despite the growing research in this area, there has not been a systematic review of the literature to determine the effects of camps on the HRQL in children with chronic illness and their families. Therefore, the purpose of this article was to critically review the research literature to determine the effect of camps on HRQL in children and adolescents with chronic illnesses and to identify implications for research, theory, and practice.

Criteria for Considering Studies for Review

Types of Participants

The literature review included children and adolescents with any chronic illness such as cancer, diabetes, asthma, cystic fibrosis, arthritis, spina bifida, and epilepsy. Although it has been argued that all chronic illnesses can negatively affect HRQL, each disease presents unique challenges.

Study Design

All quantitative and mixed-method research designs examining the effect of camps on dimensions of HRQL were considered for inclusion in the review. Although there were several qualitative studies conducted, they were excluded as there was no cogent way to compare study results across these different methodological approaches.

Types of Outcome Measures

Given the importance of understanding the impact of camp on children with chronic illness, the primary outcome measure in this review was to determine whether HRQL was affected. Therefore, studies were included if they measured any of the dimensions of HRQL including the physical, psychological, social, role, and cognitive functioning in children with chronic illness.

Search Strategies for Identification of Studies

Studies for inclusion in the review were obtained through a comprehensive search of MEDLINE (1966 to May 2004), CINAHL (1982 to May 2004), and PsycINFO (1840 to July 2004) using the following thesaurus and MeSH headings: camping, chronic diseases, quality of life, children, adolescent, and pediatric. The limit feature was used to select only human and English-language studies. Reference lists from all identified appropriate papers and review papers were examined, and then a hand search for other studies was conducted. The date of the final search attempt was August 3, 2004. No attempt was made to locate unpublished material or contact researchers for unpublished studies. A total of 18 studies met the criteria to be included in the review (Blau et al., 2002; Bluebond-Langner, Perkel, & Goertzel, 1991; Bluebond-Langner, Perkel, Goertzel, Nelson, & McGearry, 1990; Briery & Rabian, 1999; Kaplan, McKey, Toraya, & Moccia, 1992; Lord, Leger, Ridge, & Elisha, 2001; Meng, Tierman, Bernier, & Brooks, 1998; Milliet, Carman, & Browne, 1996; Misuraca, Gennaro, Lioniello, Duval, & Aloi, 1996; Moffatt & Pless, 1983; Rew, 1987; Rubin & Geiger, 1991; Sawin et al., 2001; Semiz, Ozarslan, Bundak, & Bircan, 2000; Smith, Gotlieb, Gurwitch, & Blotcgy, 1987; Smith, Schreiner, Brouhard, & Travis, 1991; Smith, Schreiner, Jackson, & Travis, 1993; Zimmerman et al., 1987).

Method of Review

Two authors (I.E. and J.S.) independently performed the computerized literature search and assessed potentially relevant studies for inclusion in this review. The methodological quality of the studies was independently
assessed by both authors using 6 criteria (Table 1). This systematic approach was modified from a set of formal guidelines developed by Hoodin and Weber (2003). Any disagreements in ratings were resolved by discussion including the third reviewer (B.S.). For each study, an overall methodological quality score ranging from 0 to 18 was obtained (Table 2). The overall score was based on ratings of 0 to 3 for each of the 6 selected parameters.

### Methodological Qualities of Included Studies

The overall scores ranged from 5 to 13, with a mean of 8 (SD = 1.5). The studies were scored in relation to camp interventions, study design, participants and recruitment, comparison groups, number of participants, HRQL outcome measures, expected HRQL outcomes, and psychological dimension.

### Camp Interventions

Camp interventions varied widely across the 18 studies. The duration of the camps varied from 1 day (Meng et al., 1998) to 4 weeks (Blau et al., 2002; Sawin et al., 2001), with the majority being 10 to 14 days. The cost of camps also varied, with 9 camps being provided free to participants (except for a small symbolic fee to ensure commitment to the camp), while others did not mention the cost of the camp. The camps also differed in the qualifications of health care professionals and camp staff. The staff ranged from 1 nurse at the camp to other camps having several (3-7) health professionals (eg, nurse, pediatric oncologist, social worker; Meng et al., 1998; Misuraca et al., 1996; Smith et al., 1991). Other studies indicated only the presence of medical staff support; however, there was no information on the number and type of individuals (Semiz et al., 2000; see also Blau et al., 2002; Lord...
et al., 2001; Rubin & Geiger, 1991; Smith et al., 1993). None of the studies reported the number of nonprofessional staff members. Only 2 studies reported the ratio of campers to staff, with one study reporting 1 counselor for every 4 campers (Milliet et al., 1996) and another reporting 1 counselor for every 2 campers (Meng et al., 1998).

Camp interventions and activities varied widely. Nine camps included disease-specific education for the campers as well as provided information or activities that targeted physical and psychosocial functioning, while 4 studies targeted only physical functioning or symptom management. Four studies did not describe the types of activities included in the camps (Misuraca et al., 1996; Moffatt & Pless, 1983; Rew, 1987; Zimmerman et al., 1987).

Study Design

The majority (n = 13) of the studies did not explicitly state their design. Most studies included in this review used a pre-post design in which data were collected before and after the camp experience. Two studies collected data during the camp using participants’ observation and qualitative interviews (Bluebond-Langer et al., 1990, 1991). Six studies used a pre-post design with repeated measures being collected at multiple points following the camp experience (Meng et al., 1998; Milliet et al., 1996; Rubin & Geiger, 1991; Semiz et al., 2000; Smith et al., 1987, 1993). The timing of data collection ranged from 1 day to 2 weeks prior to camp and immediately following camp to 1 year after the camp experience.

Participants and Recruitment

The ages of children participating in the studies ranged from 6 to 25 years. The majority of the study participants were Caucasian and from middle-class socioeconomic backgrounds. The studies included 4 camps for children with asthma, 7 for children with diabetes, 3 for children with cystic fibrosis, and 1 camp each for children with epilepsy, arthritis, and spina bifida. Children participating in the camps were at various stages of illness, with some being newly diagnosed and others more than 3 years since diagnosis. Three camps were geared to children on treatment, 1 camp was tailored to those off treatment, and 6 offered the camp experience to both. Two camps were made up of children with various chronic illnesses.

<table>
<thead>
<tr>
<th>Study</th>
<th>Health Camp Interventions</th>
<th>Study Design</th>
<th>Participants and Recruitment</th>
<th>Comparison Group</th>
<th>Number of Participants</th>
<th>Expected Health-Related Quality of Life Outcome Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blau et al. (2002)</td>
<td>2</td>
<td>2</td>
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<td>Lord et al. (2001)</td>
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<td>Sawin et al. (2001)</td>
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<td>Briery and Rabian (1999)</td>
<td>2</td>
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<td>Meng et al. (1998)</td>
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<td>Milliet et al. (1996)</td>
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<td>Misuraca et al. (1996)</td>
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<td>Smith et al. (1993)</td>
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<td>Kaplan et al. (1992)</td>
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<td>Rubin and Geiger (1991)</td>
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<td>Bluebond-Lagner et al. (1990, 1991)</td>
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<td>Rew (1987)</td>
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Seven studies did not explicitly state their inclusion and exclusion criteria. Most of the studies drew their target populations from disease-specific clinics at tertiary health care centers across the United States, Australia, Canada, Israel, Italy, and Turkey. Recruitment strategies varied widely across the studies. One study mailed study information and informed consents to all campers prior to camp (Smith et al., 1991); others recruited participants during clinic visits (Smith et al., 1987), camp registration (Smith et al., 1993), or on the first day of camp (Briery & Rabian, 1999; Lord et al., 2001). Meng et al. (1998) recruited participants from local schools through the use of school nurses who assessed children to target those children who had poor asthma control. None of the studies described the recruitment process for the comparison groups. The remaining 7 studies in this review did not provide recruitment information (Blau et al., 2002; Kaplan et al., 1992; Misuraca et al., 1996; Moffatt & Pless, 1983; Rew, 1987; Rubin & Geiger, 1991; Sawin et al., 2001; Semiz et al., 2000).

Comparison Groups

Eleven studies did not use a comparison group. One study attempted to use a wait-list control group; however, they were able to recruit only 4 participants and were therefore unable to include these data in the analysis (Briery & Rabian, 1999). This same study by Briery and Rabian (1999) compared 3 different disease health camps for children with asthma, diabetes, and spina bifida. Zimmerman et al. (1987) studied a camp that included both healthy and diabetic children. On the other hand, Moffatt and Pless (1983) compared children with diabetes who attended camp (n = 156) to those who did not (n = 30).

Number of Participants

The number of children participating in these studies ranged from 13 (Blau et al., 2002) to 256 (Misuraca et al., 1996). Eight studies had a sample size less than 50, 6 studies had a sample size ranging from 50 to 99, and 3 studies had sample sizes of more than 100 participants.

HRQL Outcome Measures

Social, cognitive, psychological, and physical outcomes were the most predominant domains of HRQL that were measured in the 18 studies. None of the studies included outcomes that evaluated all domains of HRQL. Physical outcomes included midarm circumference and triceps skin fold thickness (Rubin & Geiger, 1991), exercise tolerance scale (Blau et al., 2002; Rubin & Geiger, 1991), pulmonary function (Blau et al., 2002; Kaplan et al., 1992; Rubin & Geiger, 1991), weight change (Blau et al., 2002; Kaplan et al., 1992; Rubin & Geiger, 1991; Semiz et al., 2000), sputum culture (Kaplan et al., 1992), blood tests and glucose levels (Misuraca et al., 1996; Semiz et al., 2000), daily caloric intake (Semiz et al., 2000), range of motion (ROM; Milliet et al., 1996), and daily activity (Smith et al., 1991). The most common physical outcome measure was weight change, as it was used in both cystic fibrosis and diabetes camps and was used as a measure of nutrition status and disease management in these 2 studies.

Psychological outcomes measures included self-concept (Rubin & Geiger, 1991; Zimmerman et al., 1987), anxiety, attitudes toward illness (Briery & Rabian, 1999; Sawin et al., 2001; Zimmerman et al., 1987), locus of control (Moffatt & Pless, 1983; Rew, 1987), depression, grief recovery (Loy, 1999), stress, and coping (Smith et al., 1991). Social outcomes included social skills and social support (Smith et al., 1987). Cognitive functioning outcomes included disease-specific knowledge measures such as knowledge about asthma questionnaires, asthma IQ questionnaires (Lord et al., 2001; Meng et al., 1998), assertiveness and communication skills (Smith et al., 1993), and diabetes management knowledge (Semiz et al., 2000; Zimmerman et al., 1987).

Five studies used a battery of standardized measures and provided evidence of reliability and validity (Briery & Rabian, 1999; Rew, 1987; Sawin et al., 2001; Smith et al., 1993; Zimmerman et al., 1987). However, 6 of the studies did not report the reliability and validity of some or all of the instruments used (Lord et al., 2001; Meng et al., 1998; Milliet et al., 1996; Moffatt & Pless, 1983; Semiz et al., 2000; Smith et al., 1991). Investigators in 5 studies developed measures specifically for their study.
HRQL Outcomes

Physical Dimension

Physical dimensions of HRQL address physical functioning and physiological changes. Smith et al. (1987) assessed changes in physical activities in children with cancer using the Daily Activity Checklist, which the participants completed on 3 separate occasions. Children showed a significant improvement in physical activity, $F(2,53) = 16.14, P < .0001$, and social activity, $F(2,53) = 22.52, P < .0001$, over the 2 weeks following camp. However, this increase in physical and social activity was not maintained 1 month after camp. In Milliet et al. (1996), 2 measurements were used: (1) ROM was rated independently by 2 physiotherapists and (2) parents’ perceptions of their child’s disease status, functional level, and need for assistance during the week prior to camp, the week following camp, and 4 months after camp were assessed. The parents completed the Children’s Health Assessment Questionnaires (CHAQ; Young & Wright, 1995). There was no difference in parents’ reports of their child’s physical functioning immediately following camp or at the 4-month follow-up period compared with precamp levels of physical functioning ($P = .336$). However, the counselors perceived the children had significantly higher levels of physical functioning and independence ($P = .0003$) by the end of camp than did the parents. They also found a significant improvement in the strength of the right biceps ($P = .031$), right and left gluteus maximus ($P = .006$), and right wrist extensions ($P = .019$) as well as ROM ($P = .042$) by the end of the camp.

Three studies examined changes in pulmonary function and nutrition in children who participated in cystic fibrosis (CF) camp. Blau et al. (2002) examined weight gain, pulmonary function, exercise tolerance, and arterial oxygen saturation before and after a 4-week CF camp. All patients reported an improvement in well-being following the camp with less fatigue, less breathlessness on exertion, more energy, and increased appetite. They found a significant improvement in exercise capacity ($P = .001$) and peak workload ($P = .001$) following camp but no change in resting pulmonary function. Furthermore, sputum specimens cultured before camp and a year after camp showed no evidence of bacteria cepacia, indicating no cross-infections occurred. Rubin and Geiger (1991) examined lung functioning (using spirometry and respiratory rate), nutrition, and self-image in children attending a 2-week CF camp. There was significant improvement in nutrition ($P = .0001$) and a significant reduction (10%) in respiratory rate ($P = .006$) following camp. However, similar to the findings of Blau et al. (2002), there were no significant differences in the spirometric measurements of lung function at rest ($P = .72$). Finally, Kaplan et al. (1992) examined the effect of a 9-day camp on weight gain and pulmonary function in 58 participants who participated in a CF camp over 2 consecutive summers. The authors found no change in pulmonary function after the first summer camp ($P = .06$). However, they found a significant increase in pulmonary function after the second summer of camp ($P = .005$). Furthermore, the participants’ weight significantly increased ($P = .05$) following each summer of camp over the 2-year period.

Social Dimension

Only 2 studies in this review examined the effects of social activities on participants who attended cancer camps. Smith et al. (1987) studied 18 cancer patients and their families to assess the effects of camp on daily activity and family interactions and child self-engagement activities. Mothers completed the Interaction With Environment Checklist (Tittler, Friedman, Blotcky, & Stedrak, 1982) and daily activity scale 2 weeks prior to camp, and 4 months after camp were assessed. The parents completed the Children’s Health Assessment Questionnaires (CHAQ; Young & Wright, 1995). There was no difference in parents’ reports of their child’s physical functioning immediately following camp or at the 4-month follow-up period compared with precamp levels of physical functioning ($P = .336$). However, the counselors perceived the children had significantly higher levels of physical functioning and independence ($P = .0003$) by the end of camp than did the parents. They also found a significant improvement in the strength of the right biceps ($P = .031$), right and left gluteus maximus ($P = .006$), and right wrist extensions ($P = .019$) as well as ROM ($P = .042$) by the end of the camp.

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Bluebond-Langner et al. (1991) used participant observation and interviews to understand the relationships children with cancer have at camp and how these interactions affect children’s knowledge and understanding of cancer and its treatment. They found that children engaged in informal discussions about cancer and that this resulted in a significant increase in chil-
children’s knowledge about cancer and its treatment ($t = 2.47, P = .008$). They also reported that children established relationships with other campers that lasted beyond camp.

**Psychological Dimension**

The most common aspect of HRQL measured was the psychological dimension. Seven studies examined the psychological effects of camp using measures of attitude toward illness, self-concept, anxiety, and locus of control (LOC). Children’s attitudes toward their chronic illnesses were examined in 3 of the studies reviewed. Two studies used the Children’s Attitude Toward Illness Scale (CATIS; Austin & Huberty, 1993). In the first study, Sawin et al. (2001) found that there was no difference in attitudes toward illness prior to or following an epilepsy camp ($P = .22$). However, when attitudes were examined by frequency of seizures, there was a trend for those with more frequent seizures to report more positive attitudes after camp. On the other hand, Briery and Rabian (1999) found a significant improvement in children’s attitudes toward illness immediately following a 1-week camp ($P = .001$) across camps for children with asthma, diabetes, and spina bifida. However, only campers attending the diabetes and asthma camps had significant reductions in level of anxiety regarding their illness following their camp experience ($P < .05$). In addition, the researchers found that returning campers reported poorer attitude toward their illness than did new campers (as evidenced by comparing CATIS pretest and posttest scores for both new and returning campers, $F(1,86) = 62.20, P < .001$).

Lord et al. (2001) examined the potential impact of camp on children’s attitudes to physical and social activities, their feelings about asthma, and knowledge about asthma and its treatment. They measured these psychological outcomes prior to camp, immediately after camp, and then 3 to 4 months and 10 to 15 months following camp. Children also reported less anxiety and fear about their illness, a greater sense of well-being, and more confidence in participating in a whole range of physical and social activities following camp. Parental reports also revealed positive changes in terms of activities and asthma management 3 months postcamp. They found that children had significantly improved their knowledge of asthma immediately following camp ($P < .05$) but that this level returned to baseline by 10 months postcamp.

Self-concept was measured in 2 studies using 2 different measures of self-concept. Rubin and Geiger (1991) administered the Primary Self-Concept Inventory (Torshen, Kroeker, & Peterson, 1977) on the first and last day of a camp for children with CF. Although there was a trend toward increasing self-concept during camp, with girls tending to have a higher self-concept than boys, this did not reach statistical significance ($P = .72$). Zimmerman et al. (1987) used the Piers-Harris Children’s Self-Concept Scale (Piers, 1969) on a sample of 63 children with diabetes and 18 healthy children. Children with and without diabetes significantly increased in total self-concept scores after camp. However, the change in total self-concept scores between groups was not significant ($P = .13$).

Anxiety as a psychological outcome was explored in one study by Briery and Rabian (1999). These authors used the State-Trait Anxiety Inventory for Children (Spielberger, 1973) to measure anxiety before and after 3 types of health camps (asthma, diabetic, and spina bifida). There were no significant differences in levels of anxiety among the 3 types of camps at baseline. For all 3 types of camps, there was a significant decrease in level of anxiety postcamp as compared to precamp ($P = .05$). They also found that returning campers experienced a greater level of anxiety than first-time campers did ($P = .05$).

Two additional studies examined the effect of camps on children’s LOC. Rew (1987) studied the effects of a structured camp experience on children’s illness behavior and LOC. Rew measured LOC using the Children’s Health Locus of Control Scale (CHLC; Parcel & Meyer, 1978). Children who believed that they were responsible for what happened were considered as having internal control or exhibiting independence. Rew found a significant positive relationship ($P = .014$) between internal LOC (eg, help seeking considered as indicative of internal LOC) in children with asthma and total illness behavior (number of visits to camp infirmary) before and after camp. In other words, children who independently sought comfort or assistance from the infirmary for symptoms of asthma were also likely to go for symptoms of other illness or injury, whereas those children who did not seek asthma-related help were unlikely to make visits to the camp infirmary for other nonasthma symptoms.

Moffatt and Pless (1983) used the CHLC and the Nowicki-Strickland Children’s Locus of Control Scale (NSLC; Nowicki & Strickland, 1973), which measures
general life locus of control, in a sample of 156 children with diabetes at camp and 30 children with diabetes who did not attend camp. There was a significant improvement in internal LOC as measured by the NSLC following the camp experience compared to the control group \((P = .001)\). Although there was a statistically significant improvement in LOC on the CHLC for campers, there was not much of a difference from that of the controls \((P = .73)\), and therefore LOC was considered clinically nonsignificant. The improvement in LOC appeared to be maintained over the 1-year follow-up period in the 23 children tested with the NSLC a year later \((P = .001)\).

**Cognitive Dimension**

The cognitive dimension of HRQL was examined using the outcome of knowledge of chronic illness and self-management. Eight studies in this review conceptualized the effects of health camp (5 diabetic, 2 asthma, and 1 cancer camp) as a place where specific disease-related educational programs were taught. Smith et al. (1991) examined the impact of a formal stress management educational program on 108 adolescents with insulin-dependent diabetes mellitus. The curriculum was presented in small-group settings by trained medical staff in daily 1-hour sessions and included identification of sources of stress, effects of stress on diabetes control, and specific stress management techniques. The outcomes measures used to determine the effectiveness of the stress management program were the Ways of Coping Checklist (Palo, 1988) and the Stress Rating Scale (Smith et al., 1991). These measures were administered at the beginning and end of the camp session. After completing the camp session, adolescents reported that they would use significantly more problem-focused and fewer detachment strategies to cope with stressful situations than they would have before starting camp \((P < .03)\). Furthermore, they found that adolescents rated diabetes-related situations as being significantly more stressful than peer- or family-related situations \((P < .05)\). However, they did not include follow-up assessments to determine whether these initial changes that were found would persist over time.

In a follow-up study, Smith and colleagues (1993) examined the effects of an assertiveness communication curriculum on adolescents with diabetes. The goal of the curriculum was to teach beginning skills in assertiveness training, with problem solving and negotiation skills included. Teaching was done in small groups over 5 days, with each session lasting 1 hour. To evaluate the impact of the assertiveness communication curriculum on communication among campers and their parents, the researchers used the Adolescent Self Expression Scale (Waksman, 1984) and the Parent-Adolescent Communication Scale (Olson, McCubbin, & Barnes, 1985). They found a significant increase in adolescents’ perceptions of their assertiveness skills following the camp compared to baseline \((P < .01)\), and this increase was maintained over a 3-month follow-up period. However, adolescents reported a significant decrease in how openly they communicate with their parents \((P < .001)\). This finding illustrated that the formal education program at the camp was effective in enhancing assertive communication but once the adolescents were back at home, these newly learned skills were not effective within the family context (Smith et al., 1993).

Semiz et al. (2000) evaluated the effectiveness of a diabetic camp on children’s level of diabetic knowledge and nutrition just prior to camp, immediately following camp, and at 6 months after camp. Two groups of children \((n = 28 \text{ first camp and } n = 29 \text{ second camp, with 14 participants attending both summer camps})\) participated in a 10-day diabetic camp where education was provided regarding insulin injection techniques; blood glucose monitoring; recognition and management of hypoglycemia, hyperglycemia, and ketosis; insulin dosage adjustment based on nutrition and physical activity; nutrition; complications of diabetes; and good diabetes control. The investigators developed their own questionnaires to evaluate the participants’ level of diabetes knowledge and the beneficial effect of camp teaching on metabolic control (as measured by HbA1c levels). Although significant improvement in knowledge was detected at the end of both camp sessions \((P < .005)\), knowledge level decreased significantly 6 months after the camp compared to precamp levels of knowledge \((P < .005; \text{ Semiz et al., 2000})\). Furthermore, there was no effect of the increase in knowledge level on metabolic control of diabetes following either camp session.

Misuraca et al. (1996) examined the effects of a diabetes educational camp that employed both individual and group training sessions as well as traditional and computer-based educational techniques on diabetic management knowledge in 256 children prior to and following camp. The authors provided no information on how they assessed the level of diabetes knowledge and
self-management in these children. They reported a significant increase in children’s level of diabetes knowledge and self-management skills after camp as compared to precamp knowledge level \((P < .01)\). They did not report on which teaching method was more effective. They also reported a significant improvement in metabolic control over a 3-month follow-up period \((P < .01)\).

Zimmerman et al. (1987) examined the effect of a 1-week diabetic camp on level of knowledge about diabetes in 63 diabetic and 18 nondiabetic children. They used the Etzwiler’s Diabetes Knowledge Questionnaire to determine the level of knowledge about their disease. Although children with diabetes had significantly higher baseline level of knowledge of diabetes \((P = .05)\), both children with and without diabetes who participated in the camp had significantly higher levels of knowledge about diabetes immediately following the camp compared to baseline \((P = .05)\). Furthermore, age of onset was inversely correlated with knowledge scores, indicating that those children who had lived with diabetes for a longer period of time had a better understanding of their disease.

Two studies examined the effect of an educational camp program on knowledge level in children with asthma. Meng et al. (1998) evaluated the effectiveness of a formal asthma educational program on 34 children who attended a 6-day camp. Parents of participants also received verbal and written review of the asthma camp curriculum. Prior to camp and immediately following, participants completed the questionnaires Knowledge About Asthma Symptoms, Mastery Over Asthma, and Behaviors (Weisberg, Olson, & Sveum, 1995). In addition, participants had to demonstrate their peak-flow meter techniques, which were videotaped and analyzed. Children and their parents were interviewed via telephone about their asthma knowledge 1 year following the camp experience. They found no difference in the children’s level of knowledge about asthma between pre- and postcamp \((P = .12;\) Meng et al., 1998). However, there were several limitations of this study. The baseline knowledge scores were very high for many of the items in these measures; therefore, there was little room for their level of knowledge to improve. Furthermore, there was no comparison group, and the knowledge questionnaire had no evidence of reliability.

Lord et al. (2001) evaluated knowledge of asthma in 174 children who participated in 7 asthma education camps. Data were gathered using investigator-developed questionnaires to measure changes in level of knowledge for children with asthma. No reliability and validity information for the instruments was reported. Children’s level of knowledge regarding asthma was tested pre- and postcamp, as well as at 3 to 4 and 10 to 15 months postcamp. The results suggested that while there was good knowledge about asthma and self-management before the camp, there was a significant increase in knowledge levels about asthma immediately after camp \((P < .05)\). However, this improvement in level of knowledge diminished over time as well (5% decrease in knowledge about asthma; Lord et al., 2001).

In general, the methodological quality of the 18 studies included in the past 2 decades ranged from poor to good. Although the evidence seems to suggest that children with chronic illnesses generally experience positive effects after participating in camp, significant methodological limitations make it challenging to draw this conclusion.

**Camp Interventions**

All camps in the studies were for children with chronic illness, who participated in outdoor sport and recreational activities and were supervised by adults. Nevertheless, there were variations in terms of the activities, events, participant and staff characteristics, duration, and country. This variation in camp interventions makes it challenging to draw comparisons across the 18 studies. It is impossible to standardize camps across the world, as each camp reflects the unique nature of participant needs, goals of the camp, availability of resources for camp organizers, and characteristics of the camp as a place of care (size, location).

**Study Design**

In the past 2 decades, more children have survived chronic illness, and the role of camps has evolved, which is reflected in the various research designs used to study these camps. The majority of early studies on camps used a 1-group, pretest-posttest design. Only 6 studies used pretest-posttest with repeated measures. Many of the studies found immediate postcamp effects. However, these effects diminished over time. Randomized controlled trials are not appropriate as children cannot be randomized not to attend camp.
Comparison Groups

Failure to include appropriate comparison groups is a prevailing weakness in the majority of studies of children participating in camps. One study compared 3 different illness camps, while another study used healthy comparison groups. Appropriate comparison groups are deemed essential for camp outcomes research. Inclusion of children with the same chronic illness and demographic characteristics who did not participate in camp is absolutely essential for determining the impact of camp on physical, psychological, and cognitive domains from an experimental design perspective. Thus, careful consideration must be exercised when selecting comparison groups. For instance, researchers should not use healthy children as comparators since healthy children’s expectations may differ from those of chronically ill children whose healthy counterparts may not have undergone a life-threatening illness. The other side of this argument is that even if similar comparison groups could have been applied, the use of a control group/comparison group is often not controlled in field experiments (Chen, 1988) as it is very difficult to find and keep control individuals.

Number of Participants

Sample size varied between these studies, and only 3 studies had a sample size larger than 100. No study reported calculation of statistical power to determine whether the sample size was adequate to detect small effect sizes between groups. Furthermore, a convenience sampling procedure was used most often. This raises questions about the generalizability of the results. We do not know if children who participated in these studies are different in their demographic and personal characteristics from those children who refused to participate in these camps. Perhaps it is difficult to recruit a larger sample size when studying children in camps. This is another reason to seek an understanding of camp using the qualitative paradigm (Guba & Lincoln, 1989).

Groups of children were excluded from these samples, such as children with both chronic illnesses and other physical disabilities (eg, blind, deaf). Children who are unable to read, write, and complete the questionnaires were also excluded. The studies in this review included older school-aged children and adolescents (the average age of children attending each camp was greater than 9 years old). Although it is common for older children and adolescents to attend overnight or residential camps, we do not know the effects of camps on younger children, as only 1 study examined the effects of age and camp participation. Zimmerman et al. (1987) reported that the younger the children were at time of diagnosis, the better they learned about how to manage their illness in the camp.

Timing of Outcome Measurement

When data collection ranges from 2 days to 2 years after camp, and there is only 1 assessment point, this wide range and single assessment point render interpretations and valid comparisons between studies difficult. The wide time range suggests a considerable variation for assessing children’s HRQL following camp. In addition, since most of the data collection period was 1 day after camp, this suggests health camp research has focused primarily on the early period effects of camp.

More frequent assessments at specific time intervals throughout the camp sessions are needed to provide a better perspective and more accurate description of children’s HRQL throughout the continuum of care. Hjermstad and Kaasa (1995) stressed that timing of the HRQL assessment is important in capturing critical periods in the time of psychosocial adjustment. The rationale for the timing of assessment should be clearly stated in the studies (Hjermstad & Kaasa, 1995).

HRQL Instruments

What was missing from these studies is a comprehensive evaluation of HRQL (eg, use of both overall and disease-specific HRQL measures). Using only a performance or functional scale or a disease-specific HRQL scale to evaluate the effects of camp does not provide a comprehensive assessment of HRQL in relation to camp.

There was inconsistent use of reliable and valid instruments despite the existence of several psychometrically sound QOL instruments in the literature (Eiser & Morse, 2001). For example, Smith et al. (1987) used a scale developed for their study to assess the
amount of time (in hours) children spent in physical, social, and self-engaged activity in a specific day. There were no reports of validity or reliability with the use of this measure, and only parents completed the scale regarding their child’s activity level. This required the parent to constantly monitor their child’s level of participation in camp activities, which is difficult at best. Meanwhile, Bluebond-Langner et al. (1990, 1991) assessed knowledge of cancer using a linear analogue scale ranging from 1 to 10. A higher score was indicative of better knowledge. However, the instrument had not been validated. The use of only 5 items to assess knowledge of cancer undermines the complexity of the multidimensional concept. To account for the multidimensionality, these authors cleverly used other data collection techniques such as observations and interviews.

Children’s perception of the effects of camp on their HRQL was not addressed in any of these studies. Sixteen of the studies used child self-report measures, and 3 studies relied on proxy reports. These studies did not address the perspectives of the campers in the sense that they focused on disease-specific symptom management and relied on proxy reports from others (eg, counselor, parents, and clinicians) as a means of speaking for the children. In addition, the measures used in these studies were mainly objective parameters, thus, once again denying children the opportunity to describe their experience of living with chronic illness. To understand the effects of camps on children’s and adolescents’ HRQL, a starting point would simply be asking the children and adolescents. Furthermore, self-report measures must not be sensitive only to cognitive development and the broadest age range possible (Varni et al., 1998) but also must include the perspectives of children on their experiences with illness and disabilities (Mitchell & Sloper, 2001). For example, despite their younger age, many children who live with chronic illness know more about their illness and coping skills than their older healthy counterparts do (Horstman & Bradding, 2002).

Recently in the literature, researchers argued for the inclusion of the perspective of both the child and their parents due to differences in reports on aspects of HRQL. (Eiser & Morse, 2001; Guyatt, Juniper, Griffith, Feeny, & Ferry, 1997; Varni et al., 1998). Varni et al. (1998) emphasized the need to be aware of the differing perspectives between the parent and child in determining the HRQL of children with cancer. Balen (2000), who reviewed children’s perspectives on a cancer camp, found that children had different concerns than the adult camp organizers did. For example, some children were more concerned about how their parents might be feeling about their absence from home, as their parents were very protective of them and initially did not want them to attend camp. For some, being away from their parents and siblings was an opportunity to look after themselves and participate in “dangerous activities.”

Instruments and questionnaires were the primary form of data collection in all 18 studies. However, in the early 1990s, the studies began to incorporate observation and interview data. This shift could be due to the increase in survival rates in children with chronic illness. Camp was suddenly seen as a place that addresses social and psychological issues related to survival of chronic illnesses (Kearns & Collins, 2000).

HRQL Outcomes

Physical Dimensions

The most common measures of physical functioning and physiological change were CHAQ and weight. Several authors suggested that weighing children was an acceptable method to reflect the beneficial effects of camps (Kearns & Collins, 2000; Tennant, 1996). In general, there appeared to be an improvement in physical functioning immediately following camp; however, these improvements were not maintained over time. Perhaps at home, children are less encouraged by their parents to engage in physical play because of parental concerns about their well-being, whereas in the camp environment, physical activities are encouraged by camp staff.

In the CF camp, despite similar camp programs, children in year 1 versus year 2 experienced different physical outcomes. There were increases in reported pulmonary function ($P = .001$) after the first summer camp and no increase in pulmonary function after the second summer camp (Kaplan et al., 1992). The authors attributed these changes in outcomes to the decreased temperature during the summer in the first year of camp. Consequently, it is pivotal to incorporate other data collecting methods (eg, qualitative) to better under-
stand children’s perspectives on participating in physical activities.

Psychological Effects

Psychological effects were measured in terms of attitude toward illness, self-concept, and LOC. The effects of camps on each of these aspects of psychological functioning had conflicting results. For example, 2 studies used the same instrument (CATIS) to measure attitudes toward illness in children attending camps for epilepsy, asthma, diabetes, and spina bifida (Austin & Huberty, 1993; Briery & Rabian, 1999). Briery (1999) reported that children (n = 90) who attended asthma, diabetes, and spina bifida camp experienced better attitudes toward their illness after camp ($P = .001$), while Sawin et al. (2001) reported no difference in attitudes toward illness prior to or following an epilepsy camp ($P = .22$). However, when attitudes toward illness were examined by frequency of seizures, there was a trend for those with more frequent seizures to report more positive attitudes after camp. The differences in outcome might be attributed to the different characteristics of the illnesses or the camp interventions such as varied activities, support personnel, or both. Changes in self-concept outcomes were also inconsistent. Two studies used different psychometrically sound measurements of self-concept. Rubin and Geiger (1991) reported no change in self-concept in their study ($P = .72$) while Zimmerman et al. (1987) found changes in popularity aspects of the self-concept in which children felt more popular among their friends after camp. These conflicting results might be due to different measures of self-concept being used.

In a study by Rew (1987), independent self-care was described in relation to the numbers of visits to the camp’s infirmary over a 1-week period; thus, children who independently sought comfort from the infirmary for asthma symptoms were considered to have high internal LOC as they were able to realize they need help to manage their asthma. However, one can argue that there are other reasons why children visit the infirmary. For example, they may visit the infirmary because they do not want to participate in certain camp activities for that day; again, this emphasizes the need to ask the children themselves to describe camp experiences in their own words.

Cognitive Effects

The studies included in the literature review used various methods to detect knowledge change before and after camp. Interestingly, the knowledge change did not persist after camp for the studies (n = 506) that used formal education programs. However, only Bluebond-Langner et al. (1990, 1991) showed a long-term effect of knowledge change after camp (n = 50). The camp did not incorporate formal educational sessions about cancer and its management. Nevertheless, children not only had increased their cancer knowledge after camp, but that cancer knowledge was maintained 6 months after camp. This study reveals that children know what they need to understand about their cancer and will seek information from their peers. The information they come to know stays with them (Barker & Weller, 2003). Therefore, it is significant to hear what children have to say about camp and whether they feel that an education session about their illness should be introduced in the camp activities.

Not only are the cognitive, psychological, and physical effects of camp inconsistent, but these effects also may not last once the child returns home. There are different rules at home, and some parents do not allow children to be involved in physical activities to the same degree as they did at camp. If, at camp, the child learned assertive communication skills, when they were at home, not only did the communication between parent and child not improve, but it actually worsened. Adolescents reported a significant decrease in how openly they communicated with their parents after camp ($P = .001$; Smith et al., 1993). One possible explanation is that children return home with newly developed skills that do not work within the family environment.

Limitations of the Review

There were some limitations associated with the literature review, including the exclusion of studies not published in English, the limited search of unpublished dissertation abstracts, and the lack of contacting experts in the field for questions. In addition, only studies of chronic illness camps were reviewed. Studies focusing on disability camps and burn camps were excluded. Ideally, the review should have included abstracts of conference and symposium proceedings. In addition, the
overall methodological quality scores given to the 18 studies were adapted from other sources (Hoodin & Weber, 2003) and had not undergone validation. However, as part as this review, 2 reviewers independently used the same criteria for rating and achieved 95% agreement.

In summary, there is evidence to suggest that camps have therapeutic effects on aspects of HRQL of children with chronic illness. However, these findings may be overstated due to significant methodological issues. This literature review has highlighted some problems investigating the effects of camp on children with chronic illness. Nevertheless, it has enabled us to generate implications for research, theory, and clinical practice regarding the efforts to determine the effects of camps on HRQL in children and adolescents with chronic illness.

Implications for Theory

There are no formal conceptual frameworks related to children’s HRQL and the camp experience. The dominant conceptual frameworks of the studies reviewed were either psychological and/or medical. Within the psychological framework, the majority of studies investigated children’s coping strategies and concepts such as anxiety, attitude, self-concept, LOC, and knowledge of illness and management. The physiological frameworks explored concepts such as pulmonary function, nutrition, and weight gain. None of these frameworks help to understand individual perspectives related to the physical and psychological aspects of camp.

Implications for Research

Based on this review of the literature, we recommend the use of mixed method designs that incorporate qualitative approaches and prospective longitudinal designs. Studies should include an adequate sample size and an appropriate comparison group to investigate children’s perceptions of camp. Qualitative design can provide a detailed description of the camp experience. Researchers can ask children about the physical, social, and medical environments of the camp. Various qualitative and quantitative data collection techniques should be incorporated to allow children with various physical disabilities and chronic illness to share their perspectives. Because of the complementary nature of these designs, results would reveal more enriched findings.

If using quantitative instruments to assess HRQL, it is essential to ensure all QOL domains are represented. Therefore, along with a disease-specific HRQL scale, a generic measure should also be included. A generic measure would provide information on the overall HRQL and a comprehensive understanding of children’s HRQL following camp in comparison with other children with chronic illnesses who did not attend camp. Furthermore, it is important to include measures that explore autonomy, body image, and family relationships along with children’s expectations and experiences, if they are not part of generic or disease-specific measures (Eiser & Morse, 2001).

Clinical Implications

As camps become increasingly more important to children with chronic illness, understanding the effects of these camps on children’s HRQL is essential. Repeated hospital visits, inability to attend school, and being unable to participate in regular camps may be devastating for children with chronic diseases. To create successful camps, clinicians and parents must understand children’s perspectives on camp.

In conclusion, we found that although some camps enhance HRQL for a period of time, the physical, psychosocial, cognitive, and social effects were inconsistent. This is due, in part, to the methodologies used over the past 20 years to study the camp experience for children with chronic illness. We recommend incorporating more qualitative descriptive designs that include children to better understand what camp means to them. Understanding the perspective of the child should help researchers and those who plan camps to develop interventions and programs that address HRQL issues.

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