Evaluation of a Bicycle Helmet Giveaway Program—Texas, 1995

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ABSTRACT. *Objective.* **To determine the effect of a bicycle helmet giveaway program on helmet use among children.**

Methods. **In 1995, a bicycle helmet giveaway program was conducted in two rural towns in Texas. Helmets were given to all 403 school children in kindergarten through grade 8. Helmet education, a bicycle rodeo, and incentives to increase helmet use were part of the program. Observations of helmet use were made before the helmet program began and after the program at several intervals throughout the school year and during the summer. A self-reported survey questionnaire was administered to children in grades 4 through 8 before the helmet program began and at several intervals during the school year to determine their attitudes about helmet use, safety perceptions, and peer pressure. A questionnaire also was administered to the parents of these children to determine attitudes and bicycle helmet use among parents.**

Results. **Helmet use increased from 3% before the giveaway to 38% at the end of the school year, 7 months later. However, during the subsequent summer, helmet use decreased to 5%. Helmet use among 7th- and 8th-grade students was 0% at all observations periods after the giveaway. Even though 96% of all students thought that helmet use increased riding safety and 68% thought helmets should be worn at all times when riding, only 25% thought that their friends would approve of helmet use. Most parents also believed that helmets increased riding safety and should be worn, but only 23% reported always wearing one when riding a bicycle.**

Conclusions. **Bicycle helmet giveaway programs can increase helmet use temporarily, but they may not be sufficient to sustain it. This program was not effective among 7th- and 8th-grade students.** *Pediatrics* **1998;101: 578–582;** ***bicycles, helmets, children.***

ABBREVIATION. K–8, kindergarten through grade 8.

Approximately 66.9 million Americans rode bicycles in 1991, and approximately half were <21 years old.[1] Although bicycle riding might seem harmless, ~800 deaths are caused by bicycle crashes annually in the United States. In 1993, 352 of the deaths occurred among individuals <20 years of age.[2] Most bicycle-related deaths are caused by head injuries sustained during a crash.[3] Approximately 140 000 cases of nonfatal, bicycle-related head injuries among individuals <20 years of age are handled in emergency departments every year in the United States.[4] The cost of medical care for bicycle-related injuries averages $6 billion per year in the United States.[5]

When fitted and used properly, bicycle helmets can reduce the risk of head injury by ~85%.[6] Accordingly, one of the national health objectives developed by the US Department of Health and Human Services to be achieved by the year 2000 (Healthy People 2000) is to increase bicycle helmet use to at least 50% among all bicycle riders.[7] Although this goal could affect bicycle riders of all ages in the United States, it is expected to have the greatest impact on children, because they make up the largest percentage of bicycle riders and potentially have greater lifetime riding exposure. Unfortunately, most children do not wear helmets when riding bicycles. A national telephone survey conducted in 1994 found that only ~25% of children 5 to 14 years old always wear bicycle helmets.[8]

Many organizations have funded programs intended to increase helmet use among children.[9] Such programs typically provide helmets for free or at greatly reduced prices. While increasing the number of children who own bicycle helmets, it is not known whether such programs increase the number of children who wear them.

Measuring helmet use after a giveaway program is difficult. Although the standard of measurement in the community is the observational study, obtaining an unbiased sample is not easy. In most communities, observing all areas where program participants might be found riding bicycles would be extremely time-consuming and expensive. Obtaining a probability sample of children exposed to the program requires observations in many parts of town, without counting the same child more than once. Even if this could be done, it would be difficult to determine whether the bicycle riders observed had participated in the helmet program unless each child could be identified as a program participant in that community. In a large city, it would be almost impossible to determine which riders observed had been exposed to a helmet giveaway program.

Also, observers would need to determine whether helmeted riders are wearing giveaway helmets. Most

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programs try to distribute helmets that have a unique color or logo to make identification of children exposed to the program more reliable. However, some children do not like to wear helmets with program logos because they fear ridicule from their peers. Furthermore, it may be difficult to determine the effect of a specific program in a community if there are other influences such as mandatory bicycle helmet use laws.

We were able to overcome these methodologic obstacles by observing the results of a helmet giveaway program involving all elementary and middle-school children in two rural, isolated towns that did not have helmet-use laws.

METHODS

Interventions

The bicycle helmet program was initiated concurrently in Seadrift and Port O'Connor, two small south Texas towns, in September 1995. All 403 school children in kindergarten through grade 8 (K–8) were given helmets. Initial program activities required a full school day to conduct and consisted of fitting children for helmets, providing safety education, and giving every child a free bicycle helmet. All helmets were identical, except for color, and were not available for retail purchase elsewhere. A bicycle rodeo was held to teach and practice safety skills. Two students absent from school on the day of the helmet program received helmets and printed safety materials when they returned to school.

The subsequent incentive program to increase helmet use began ~2 weeks after the helmet giveaway. Teachers and local observers drove through the towns on various days of the week and at different times of day looking for bicycle riders wearing helmets. Children seen wearing helmets while riding received coupons from teachers that could earn them cash prizes at drawings held during the school year. Flyers posted in the schools and announcements made by teachers and principals made students aware of the program. The incentive program continued for ~6 months, until the end of the school year; 35 children earned prizes ranging from $5 to $20.

Observations of Helmet Use

Three weeks before the helmet giveaway, observers from the Texas State Department of Health determined baseline helmet use in both towns. While accompanied by an individual from the town who could likely identify the children by name, age, grade, and gender, the observers drove around the schools in a manner that permitted unobtrusive observations throughout each town. In addition to demographic information, the observers recorded whether a child riding a bicycle was wearing a helmet. The observations were repeated before and after school and on Saturdays during the school year for observation periods at 1 day, 2 weeks, and 7 months after the helmet giveaway. The final observation period took place during the summer, 9 months after the program began. Only observations of children in grades K–8 were included in our analysis. If a child was seen riding multiple times during a single observation period, only the initial encounter was used for analysis.

Self-reported Surveys of Attitudes and Behaviors

Children

A self-reported survey questionnaire was administered during class to each child in grades 4 through 8 on the day before and at 2 and 6 weeks after the giveaway. The questionnaire covered bicycle use, helmet ownership, helmet use, safety perceptions, peer-pressure issues, and the child's opinion as to whether helmet use should be mandated by law. During the second and third survey periods, children did not have access to their previously completed questionnaires. We excluded from our analysis children who reported not riding bicycles at the time of the first survey ($n = 7$) and those who did not complete all three self-reported surveys ($n = 32$).

Parents

Six months after the helmet giveaway, we mailed a questionnaire to parents of children in grades K–8 to identify their attitudes, behaviors, and beliefs about bicycle helmet use and safety. This questionnaire was translated into Spanish and Vietnamese to accommodate the parents who did not speak or read English. Only completed questionnaires from parents with at least one child who rode a bicycle were used in the descriptive analysis.

Data Analysis

We pooled data from both towns when analyzing the self-reported survey and observation data. This was done because we found no statistically significant differences between the towns on the basis of the percentage of children who rode bicycles or used helmets before the giveaway or the attitudes of students on the self-reported surveys. Our approach was validated by 1994 post-census estimates that showed the towns to be demographically similar. Both towns had populations of ~1200, had ~50% of adults ≥25 years of age who did not have a high-school diploma, and had ~50% of adults ≥25 years of age employed by a single chemical manufacturing plant. We also pooled by gender, because there were no significant gender differences in helmet use before or immediately after the helmet giveaway. Also, there were no gender differences in attitudes on the self-reported surveys.

Data from the observation periods were combined by grade into two categories: grades K–6 and grades 7 and 8. Data from the self-reported survey periods were combined by grade into two categories: grades 4 through 6 and grades 7 and 8. Statistical differences in observed bicycle helmet use between grade categories and statistical differences in attitudes between grade categories were determined using the χ^2 or Fisher's exact test, as appropriate.

Data across self-reported survey periods were compared by matched analysis using the McNemar test to determine whether attitudes changed significantly over time. Data obtained from survey periods involving small sample sizes were analyzed using the Sign test. For all tests, differences were considered statistically significant for $P < .05$.

RESULTS

Observations of Helmet Use

Before the helmet distribution, 3% of children seen riding bicycles wore helmets; all helmeted riders were boys. One day after the helmet giveaway and safety education, 25% of the children seen riding bicycles wore helmets; 30% wore helmets 2 weeks after the giveaway (Table). During the first observation period after the helmet giveaway, riders in the grades 7 and 8 category were significantly less likely to wear helmets than all other children in the grade K–6 category. Results of the second observation after the helmet giveaway were not statistically significant; however, sample sizes were small.

Tests of statistical significance were not conducted for the two last observation periods because few children were observed because of inclement weather and shorter observation periods. Seven months after the giveaway, observed helmet use was 38%. However, during the summer, 9 months after the giveaway when school was out and the incentive program over, only 5% of children observed riding bicycles wore helmets.

Self-reported Surveys of Attitudes and Behaviors

Children

Of 218 children in grades 4 through 8, 179 (82%) rode bicycles and completed all three self-reported surveys. After the helmet giveaway program, the percentage of bicycle riders who thought a helmet

TABLE. Pre- and Postgiveaway Bicycle Helmet Use by Grade, Texas 1995

Riders Observed Grade Category	3 Weeks Before Helmet Giveaway *n* (%)	1 Day After Helmet Giveaway* *n* (%)	2 Weeks After Helmet Giveaway *n* (%)	7 Months After Helmet Giveaway *n* (%)	9 Months After Helmet Giveaway *n* (%)
K–6	122 (3)	128 (28)†	38 (34)	18 (44)	30 (7)
7–8	25 (4)	11 (0)†	5 (0)	3 (0)	10 (0)
Total Observed	147 (3)	146 (25)	43 (30)	21 (38)	40 (5)

n Indicates total number observed by grade category and overall; %, percentage of helmeted riders for each grade category and overall.
* Grade categories of all riders observed could not be determined.
† Comparison between grade categories K–6 and 7–8, $P < .05$.

could protect their head during a bicycle crash decreased significantly in both the 4 through 6 and the 7 and 8 grade categories. Positive responses among children in grades 7 and 8 also decreased significantly when asked whether everyone should have to wear a bicycle helmet when riding and whether helmet use should be a school rule. In contrast, the percentage of children in grades 4 through 6 who felt that helmet use is socially acceptable increased significantly in the last survey (Figure).

Parents

Most (94%) of the 230 parents who were mailed surveys completed and returned them. When asked about their children's bicycle helmet use, 42% thought that their children always wore a helmet, 47% thought that their children sometimes wore a helmet, and 11% thought that their children never wore a helmet. Although 69% of parents reported riding bicycles, only 23% reported always wearing a helmet when riding. Approximately 70% of parents believed that their helmet use would encourage their children to use helmets. Most parents (99%) thought that a bicycle helmet could prevent a head injury; however, only 62% always encouraged their children to wear one. Many parents thought that additional safety education, more incentives, media campaigns, and laws would effectively increase helmet use.

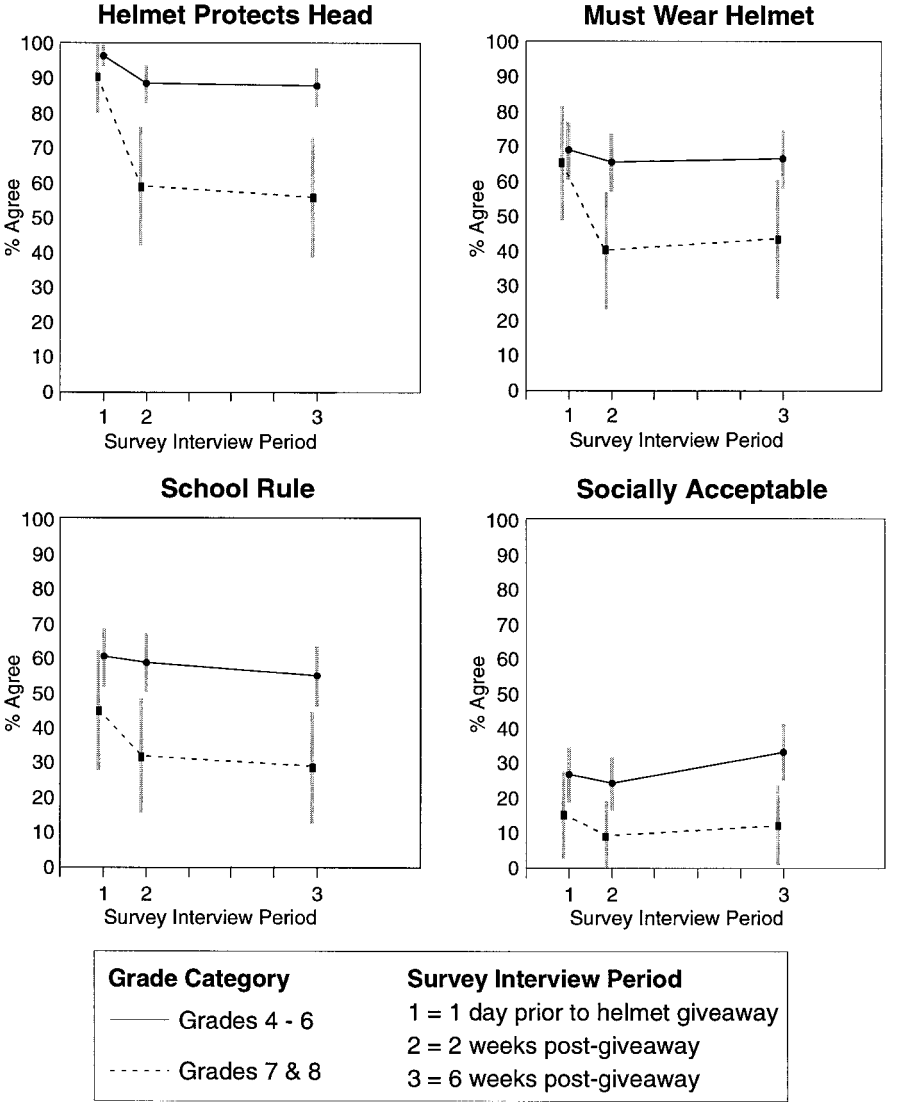

Figure. Bicycle helmet attitudes by grade category, Texas 1995.

DISCUSSION

This study showed that a bicycle helmet giveaway program in conjunction with a school education program and incentives was effective at increasing helmet use, but only temporarily. It also showed that bicycle-safety education was not sufficient to produce positive attitudes toward bicycle safety. In fact, when children were asked whether bicycle helmets can protect the head during a crash, whether helmets should always be worn when riding bicycles, and whether helmet use should be mandated through their school, their positive attitudes decreased after the safety education. We believe these decreases resulted from peer pressure. Most of the children in this study reported concern about the social acceptability of helmet use, although they liked the helmets they were given. Several other studies have shown fear of negative peer pressure to be a barrier to increasing helmet use.[10–12]

In this study, self-reported beliefs of helmet efficacy did not predict observed helmet use. Similarly, in a study conducted by Gielen et al,[13] >90% of respondents in grades 4, 7, and 9 agreed that wearing a bicycle helmet "can save your life and is a good way to protect your head," but only 19% reported wearing a helmet during their last bicycle ride. In a study conducted by Otis and colleagues,[10] all respondents said they believed that bicycle helmets increase safety, but that other factors (eg, appearance and comfort) were more important.

Helmet programs appear to have a greater effect in higher-income areas than in lower-income areas.[14,15] In a national survey conducted in 1994, helmet use was 34% among households earning >$50 000 annually, whereas use was ~20% among households earning <$20 000 annually.[8] However, in the towns in our study, where the median household income was between $5000 and $10 000 per year, use increased to ~38% during the school year. These findings suggest that the effect of income on helmet use may be influenced by a giveaway program or other program factors.

In our study, as in others,[1,16,17] observed helmet use among 7th and 8th graders was lower than among younger children. The most bothersome finding of our study was the decrease in helmet use during the last observation period. Several factors could have contributed to the decreased helmet use. We believe the primary cause was the ending of the school term, the ending of the incentive program, or both. After the school year ended, children no longer had teachers and administrators to remind them to wear a helmet; children who needed encouragement to wear their helmets were dependent on their parents for it. Because this program did not educate the parents or seek their support, it is likely that many parents did not sufficiently encourage their children to wear bicycle helmets.

Parents can have an important role in promoting helmet use among children. Several studies have suggested that parental use of bicycle helmets can increase helmet use among children.[12,18–20] Although ~69% of parents in our study reported riding bicycles, few reported wearing helmets. Only 62% of all parents reported consistently encouraging their children to wear helmets. Many suggested enacting laws or giving children more safety education as methods that might increase helmet use. Some studies have shown that legislation, in addition to education, can increase helmet use effectively.[21]

Because the helmet program was conducted in the school, perhaps the school itself served as a reminder for children to wear their helmets. Children could have considered the bicycle helmet as only necessary during the school year, as with a school uniform.

Many parents and teachers thought that some children wore bicycle helmets to get cash incentives. Students were aware that the incentive program would conclude with the end of the school year and might have stopped wearing their bicycle helmets because their perceived benefit of helmet use was no longer available. Because the school year and the incentive program concluded at the same time, their individual effects could not be assessed.

The limitations of this study must be considered when interpreting the results. Self-reported surveys have potential biases. Although students completed the questionnaires individually, many might have felt pressure to give a response that would be approved by their peers, parents, or teachers. For the parent surveys, it is possible that the meaning of some questions was slightly changed during translation. In addition, many of the parents might have had difficulty in understanding some questions because of their educational level.

Sampling bias could have occurred if an observer drove more frequently through a part of town where riders were particularly likely to wear helmets. However, because observers drove through all parts of towns, we believe this to be unlikely. Misclassification bias could have occurred when recording the observations. Children were usually seen riding in groups, making accurate recording of helmet use data more difficult. The small sample size obtained during some of the observation periods could have been insufficient to accurately represent helmet use.

CONCLUSION

Recommendations

These findings suggest that bicycle helmet giveaway programs alone will not be sufficient to sustain high usage rates among youth and may not benefit teens at all. New prevention strategies are needed to increase and maintain bicycle helmet use among children, especially young teens. Our findings do not suggest that bicycle helmet giveaways are ineffective; rather, that they are only partly and temporarily effective. Giveaways should be coordinated with other activities (eg, education or incentives) that occur at several intervals throughout the course of a helmet program.

Because parental support appears to have an impact on success, helmet programs should involve parents and encourage their bicycle helmet use. In addition, it has been shown that counseling from health care providers may be a good adjunct to some

programs.[8] Helmet programs should develop methods to address the disparity between beliefs and actions identified in this study. Future media campaigns should promote helmets as being socially acceptable and a good way to protect one's head. Further evaluation should be conducted to determine whether bicycle helmet promotion programs initiated through local organizations rather than through schools would have a longer-lasting effect.

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