SEEING STARS:
ASSESSING THE EFFECTIVENESS OF AN ATV EDUCATION PROGRAM

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ABSTRACT

The Safe Tips for ATV Riders “STARs” educational program is aimed at making an impact on young people who are riding or presented with an opportunity to ride an ATV. The use of ATV’s in rural communities is higher than in densely populated communities due to the nature of the vehicle being used in off-road applications for recreation or for farming practices. Riding an ATV involves almost twice the risk of injuries serious enough to require hospitalization relative to other high risk sporting activities such as football and snowboarding. This study examines the effectiveness of the STARs education program administered to youth in Iowa, which aims at increasing knowledge of ATV manufacturer guidelines, state laws, and safety behaviors.

Data were collected from student populations before and after attending the STARs program in which participants were taught about risks associated with ATV riding and the possible outcomes of risky behaviors. Six to nine month later a follow-up survey was distributed to see if an increase in knowledge was retained.

This study suggests that the STARs educational program does increase knowledge immediately following the program and 6-9 months later. Data collected provides evidence of an increase in cognizance of how many riders an ATV is designed to carry, the largest engine size recommended for 12 – 15 year olds, and when an ATV can legally be ridden on a public road, representing a high level of information retention. This study indicates that ATV presenters should be encouraged that the information they distribute will have a positive and lasting impact on education recipients. The STARs educational program should enable youth to make better choices in how they ride an ATV and that there may be fewer fatalities because of being a recipient of this educational program.
ACKNOWLEDGMENTS

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I would especially like to thank Kohl’s Cares for grant funding to develop and implement the STAR’s educational program through the University of Iowa Children’s Hospital.

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My thanks go out to my family and friends for their constant encouragement. In particular, I thank my mother and father, Joanie and Gerry Peck, for always cheering me on and instilling in me that there is nothing you cannot do if I just set my mind to it.

Lastly and most importantly, I thank Terry R. Hostetler, my life partner and best friend, for his infinite support, patience, encouragement, and confidence in me along this journey. He has been there every step of the way and strengthened me to become the person I am today.
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INTRODUCTION

The ATV was designed for off-road recreation. In 1970 American Honda Ltd released the first ATV in the world [2]. Although designed primarily for recreational purposes, within a few short years rangers and farmers began seeing the ATV as a useful tool to help in getting work done and make their lives easier. Due to the smaller gas powered engine, ATVs used substantially less fuel than tractors, cost less money than tractors, and allowed farmers a way of getting around agricultural lands, through gates, and from paddock to field with an ease that made ATV’s a tool well worth the investment. The use of ATV’s in rural communities is higher than in densely populated communities due to the nature of the vehicle being used in off-road applications for recreation or for farming practices [17].

The current study examines the effectiveness of an ATV education program administered to youth in Iowa, which is aimed at increasing knowledge of ATV manufacturer guidelines, state laws, and increase safety behaviors such as wearing a helmet, riding the right size machine for your age, and only one rider at a time.

BACKGROUND

During the early years of ATV production (1970 – 1985) emergency rooms across the United States saw an increase in trauma patients due to the ATV use and the lack of training and safety education. In 1988, in response to a lawsuit filed by the United States Consumer Product Safety Commission (USCPSC) against the existing ATV manufacturers, all parties agreed upon a series of recommendations. This agreement became known as the “1988 Consent Decrees” and it established ATV guidelines for the general public [1]. The 1988 Consent Decree mandated that manufacturers and dealers provide sufficient information to anyone buying a new ATV regarding specific and appropriate use recommendations. The most noteworthy
components of the Consent Decree where:

1) Three wheel ATV’s are more dangerous than 4 wheel ATV’s simply due to the design. The Consent Decree banned the production of 3 wheel type ATV’s.

2) The recommendation to never allow passengers.

3) Free safety courses for beginners.

4) Required helmet use.

While the decree was in place for a period of ten years the USCPSC reported a gradual decrease in ATV injuries and fatalities particularly in the pediatric population. The 1988 Consent Decree expired in 1998 at which time the USCPSC entered into a voluntary agreement with ATV manufacturers referred to as the “All-terrain Vehicle Action Plan” which was a legally non-binding agreement with limited enforcement. Immediately after expiration of the Consent Decree the USCPSC acknowledged that the number of ATV crashes and injuries was once again on the rise. In 2002 it was concluded that the 1988 decree has done nothing to limit the quantity, severity, or cost of ATV accidents and deaths [15].

The ATV safety institute [4] estimates now there are over sixteen million Americans who ride ATV’s with most being found in the country’s rural areas where the machines are used as agricultural implements. Still recreational use is primarily found in rural areas where large tracts of land are needed for ATV trails and parks. Across the United States in rural communities it is not uncommon to see young ATV riders on private lands, along or on roadways. Riding an ATV involved almost twice the risk of injuries serious enough to require hospitalization, relative to other activities, including football and snowboarding. Data from the Department of Health in Massachusetts for the years spanning 2004-2005 found 935 ATV related injuries were recorded
in Massachusetts, accounting for 30% of all reported ATV injuries in the state. The average age of the injured child was 13.3 years. Currently approximately 40,000 children under age 16 are seriously injured per year in ATV related incidents and of that about 130 U.S. Kids Die Annually on ATVs [5]. Over the course of the past two years there have been at least 24 youth fatalities due to ATV crashes in Iowa [12].

The Specialty Vehicle Institute of America (SVIA) documents that ATV industry does provide age and size recommendations for ATV riders [3]. ATV sizes are rated by engine size in cubic centimeters or cc’s. The following table indicates the ATV industries guidelines for age appropriate size for operation of these vehicles.

<table>
<thead>
<tr>
<th>Age 6 and Under</th>
<th>Never ride an ATV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age 6 – 11</td>
<td>Engine Size &lt; 70cc</td>
</tr>
<tr>
<td>Age 12 – 15</td>
<td>Engine Size 90cc or less</td>
</tr>
<tr>
<td>Age 16 and older</td>
<td>Engine Size 90cc and up</td>
</tr>
</tbody>
</table>

The SVIA report additionally documents that nearly 90 percent of all youth ATV-related injuries involve a youth riding an adult-size ATV. While these guidelines are representative of the larger population, not all young persons have the strength, skills and necessary judgment needed to operate an ATV. Parents need to be responsible in determining if their child has the capability and awareness to operate an ATV safely.

Emergency rooms continue to see a rising number of injuries from ATV crashes among youth 13-15 years of age. In 1997 there were an estimated 54,700 ATV related injuries treated in the U.S. emergency rooms, including an estimated 21,132 in children under the age of 16.
years. By 2001, the number of people treated in U.S. emergency rooms for ATV related injuries had increased to 111,700; including an estimated 22,071 children under the age of sixteen [7]. Data collected on ATV related injuries provided by the Consumer Product Safety commission documented in 2004, 44,700 children under the age of 16 were treated in the United States emergency rooms [16]. The U.S. Consumer Product Safety Commission (CPSC) compiles data on fatal and non-fatal injuries occurring from ATV accidents since the early 1980s. In 2010, 115,000 people were seriously injured in ATV crashes. Of these 25 percent-or 28,300-were under age of sixteen [4].

Operation of an ATV weighing 300 to 700 pounds requires that the operator be of size and physically capable to maintain control of the vehicle when operation on uneven terrain or at high speeds, with some able to travel at speeds greater than 70 miles per hour [17]. ATV use in rural communities it is not uncommon for riders younger than 16 years of age to use machines that are designed for adults while performing farming practices or riding for recreation [14]. In 1996 a study performed in Indiana found that 86% of adolescents under the age of sixteen operated an ATV that was designed for an adult ATV use is not simply a problem in the United States. It has been documented that ATVs are used worldwide [19].

Comparing ATV use between urban and rural communities, finds that rural youth rode more often than urban youth and have greater exposure to the machines. Typically youth in these communities were found to ride with more than one person on the machine, with a significant number being other family members [11, 13]. Carrying passengers significantly increases the risk of crash in rural communities where ATVs are being used for recreational purposes. While operating an ATV, the driver knows in advance how they are going to react to the terrain they are riding on; however, the passenger is not aware of how the operator is going to
turn, maneuver, or react to a particular situation, thus making the passenger more susceptible to ejection and injury. This reemphasizes that ATV’s are designed for single riders, and that passengers are at great risk when aboard.

Helmets have been known to reduce the risk of fatalities in ATV accidents by 42 percent. They have also been known to reduce the possibility of non-fatal head injury by 64 percent. High percentages of youth rarely wear safety equipment. Studies document the vast majority of youth admitted to hospital emergency rooms were not wearing any protective equipment, most notably helmets. Children and adolescents have a very low helmet use, as low as 8%-16% [7, 8, 14, 19].

While ATV sales continue to grow, and machines becoming larger and more powerful, it is documented that most children receive little safety instruction [6]. The majority of individuals surveyed in Manitoba, Canada and throughout the U.S. indicated that they had been riding an ATV for extended periods of time and have received little or no formal training. In fact studies show that only 1% of ATV riders have ever taken any safety training [18, 19]. As a result, the number of ATV riders across the U.S. and in Iowa are in need of emergency room care is on the rise [4, 12].

In 2004 researchers investigated the knowledge, practices, and beliefs of ATV users to develop an effective educational strategy to promote safer ATV usage [7]. While most participants endorsed messages demonstrating graphic consequences as being more likely to get the attention of young rider, and while these campaigns reached vast audiences, the overall implication was they provided little or no impact on changing behaviors of regular ATV users. What was found was that face-to-face education programs seemed to be most effective. One ATV safety education program for rural communities in Mississippi outlined in detail, the
necessary partners and steps for implementing a sound educational program [9]. This is substantiated by a program where farm youth where using ATVs and the prolonged distribution of safety guidelines and education given on a regular basis helped to increase overall safety behaviors. With prolonged and repeated education, intervention farms showed a significant decrease in risk behaviors and crashes [10].

PROBLEM STATEMENT

With the sale of ATVs continuing to grow and more machines available to youth of all ages, particularly in rural communities, an increasing number of young riders will inevitably be involved in an ATV related injury and need emergency room care. Due to the serious nature of these crashes involving youth, health care providers, emergency responders, and safety advocates are focusing more on what is being done to educate youth in communities where ATV’s are being used regularly. While the use of an ATV can be beneficial in rural communities for farming practices and family recreation, strategies are needed to keep those who ride ATV’s safer. Educational efforts have the potential to increase safe behaviors and decrease injuries particularly in youth. If reached at an early age and before young people ever have the opportunity to ride an ATV, beliefs are that those who have the opportunity to ride these heavy and powerful machines may make sound choices when faced with decisions about safety. However, more research is necessary on whether ATV safety programs have a successful impact on changing behaviors, particularly in rural communities.

EVALUATING THE STARS PROGRAM

Safe Tips for ATV Riders “STARs” program was designed to generate ATV safety awareness, reinforce good riding behaviors, and change or modify unsafe riding habits of young riders. This educational program was developed through collaboration of the University of Iowa
Children’s Hospital, Safe Kids Iowa, Safe Kids Johnson County, the Iowa Department of Natural Resources (IADNR) and the United States Army Corps of Engineers (USACE). The STARs educational program was developed by a multidisciplinary task force to generate ATV safety awareness and reinforce better riding habits in youth ages 12-15. The STARs program aims to influence the young rider to reduce unsafe behaviors, and is presented in schools where invited by educators and administrators. The STARs educational safety curriculum was designed with a target audience of adolescents 12-15 years of age, but can be modified and presented to those of any age. The goal of this educational program is to provide participants with the knowledge and tools necessary to be safe while riding and ATV and thereby reducing the number of ATV related injuries and deaths in adolescents in eastern Iowa.

Few studies have been conducted determining the effectiveness of ATV educational programs designed to increasing safety awareness and changing high risk behaviors of adolescent riders. The objective of this research is to determine the effectiveness of the STARs program and the increase of safe ATV riding knowledge in order to make educated decisions when presented with the opportunity of riding an ATV. Attendees will be assessed on pre-knowledge of ATV safety prior to STARs presentation. Participants are assessed immediately after the presentation to determine immediate gain in knowledge of ATV safety strategies. Follow-up data were collected and evaluated to see whether long-term knowledge was retained after the STARs program presentation. Data were analyzed to determine if there are any differences between groups including gender, age, and children whose families own ATV’s versus casual riders who ride an ATV by someone else. To date, 13 presentations to 2285 youth have been given throughout eastern Iowa.
The STARs program was developed in 2010 by assembling a multidisciplinary ATV task force at the University of Iowa Children’s Hospital and Clinics in Iowa City, Iowa who were dedicated to reducing the increasing number of injuries among young ATV riders. The team of experts consisted of health care providers as well as conservation and law enforcement officers. The task force developed and piloted this comprehensive school ATV injury prevention curriculum in rural communities throughout eastern Iowa where ATV use is prevalent. The Curriculum was developed using an evaluation research approach.

This wide-ranging school ATV injury prevention curriculum is based on applied learning, behavioral, and socialization theories to promote positive attitudes and behaviors for ATV safety. The program was designed with intent of comparing differences in students’ knowledge, attitudes and behaviors regarding ATV safety directly before and after each presentation. Further, follow up data were collected after a considerable period of time to see if the STARs program had a lasting effect on recipients who attended any of the presentations. This well designed approach has been used to determine whether the STARs program indeed had a sustained effect on ATV safety behavior changes and attitudes.

The population of interest are students attending school in rural areas where the likelihood of access to ATVs are generally considered to be higher than would be expected for students in more urban areas.

The ATV task force solicited schools throughout eastern Iowa by the use of e-mail, conventional mailings, and at presentations at educational conferences informing school nurses
and administrators about the STARs programs. These communications informed the recipients of the curriculum and ask if they would be interested in a presentation at their school for students. The availability of the STARs program to all rural school communities in eastern Iowa was broad reaching through the use of this recruitment process. Rural communities with high ATV usage or those who found high value in the supplemental educational program and communities who had first-hand experience of youths who had suffered from ATV crashes were the first to invite STARs presentations into their schools. Upon request from nurses or administrators requesting a STARs presentation, the task force then coordinated date and time for the ATV safety curriculum to be presented.

**STARS CURRICULUM**

The STARs program incorporates real life stories of youth who have suffered severe ATV crash related injuries, demonstration with an interactive “tilt table” designed to portray ATV instability, as well as supplemental educational materials in an effort to focus youth’s attention on ATV safety.

First a video is presented telling an ATV crash survivor’s story. This video depicts what actually happened to the ATV rider. The survivor, nurses, friends, and family members discuss what happened leading up to the crash, directly after the crash, and during the hospitalization of the survivor after the crash, and how it impacted them. The use of the video with narration by the survivor, friends, family members, and healthcare professionals impacts the audience in only a way someone who has been seriously injured can communicate their story. Correspondingly the visual impact has a genuine effect on those who see it that words cannot express.

Following the video a uniformed task force member presents a power-point presentation exemplifying the ten safety tips for ATV riders and providing detailed information on how each
tip can effectively assist those exposed to ATVs to become safer while riding.

1) Wearing a helmet
2) One rider at a time
3) Riding the right size machine
4) Wearing other proper safety equipment
5) Never riding on roadways
6) Taking a safety course
7) Telling someone where you are riding and when you will return
8) Respecting private property
9) Never use drugs or alcohol when riding
10) Knowing the all rules and regulations

Next another true life case is then presented. This story depicts a youth who was involved in an ATV crash and is now a paraplegic. Photos with narration by University of Iowa Pediatric Trauma nurse highlight the youths accident before and directly after the crash, during hospitalization, and finally during rehabilitation. The most dramatic photos of this youth is back at school in a wheel chair where the audience in told “this is this young person’s new 4 wheeler”. This case emphasizes the reality that an ATV injury doesn’t just affect the one injured – it affects everyone around the injured party.

Lastly those in attendance are given a demonstration of how easily an ATV can actually roll. Through the use of a hydraulic tilt table, having 360 degree rotational capabilities, using a real full sized ATV aboard is used to show how unstable an ATV can actually be. Complete with measurement instrumentation the tilt table shows at what percentage an ATV actually will roll over. Once the tilt table is operated showing the ATV actually tilting off its wheel base, individuals actually gain an understanding of how unstable these heavy machines actually can be. The tilt table demonstration reemphasizes all of the massages of the STARs program and connects the importance for taking safety precautions when riding. At the end of each presentation students are provided with an informational brochure that provided comprehensive information that was presented during each STARs presentation.
This research aims to assess the effectiveness of the STARs program in changing ATV knowledge over a prolonged period of time. Accordingly, attendees are taught about risks associated with ATV riding and possible outcome of engaging in risky behaviors. Additionally, participants of the program are educated on knowledge to enable them to minimize the impact or exposure to injury. At the end of each presentation students are provided with an informational brochure that provided comprehensive information that was presented during each STARs presentation.

METHODS

Procedure and data collection

Before each presentation program attendees of the ATV safety presentation are each given a hand held automated keypad response devise, with the intention of collecting front end or pre data from student populations answering question in order to gather overall demographics, as well as exposure, attitudes, and knowledge, regarding ATVs and safe riding habits, via use of the hand held automated keypad response devises. The following table provides pre data questions:
Table 2 Demographics, exposure, and knowledge

<table>
<thead>
<tr>
<th></th>
<th>How old are you?</th>
<th>&lt;12</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>&gt;16</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>What is your gender?</td>
<td>Male</td>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>How often do you ride an ATV?</td>
<td>Daily</td>
<td>1-2 times a week</td>
<td>3-4 times a month</td>
<td>A few times a year</td>
<td>Never been on an ATV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Have you ever ridden an ATV with one or more person?</td>
<td>Yes</td>
<td>No</td>
<td>Never been on an ATV</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Have you ever ridden an ATV on a Roadway?</td>
<td>Yes</td>
<td>No</td>
<td>Never been on an ATV</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Have you ever been in a crash?</td>
<td>Yes</td>
<td>No</td>
<td>Never been on an ATV</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Do you wear a helmet?</td>
<td>Never</td>
<td>Some of the time</td>
<td>Most of the time</td>
<td>All of the time</td>
<td>Never been on an ATV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>How many people is an ATV designed to carry?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>Don’t Know</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>What is the proper size ATV for 12-15 year olds?</td>
<td>70cc or less</td>
<td>90cc or less</td>
<td>100cc - 250cc</td>
<td>275cc-400cc</td>
<td>400cc or greater</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>How often do you wear safety equipment?</td>
<td>Never</td>
<td>Some of the time</td>
<td>Most of the time</td>
<td>All of the time</td>
<td>Never been on an ATV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>When is it legal to ride on the road?</td>
<td>When it is gravel</td>
<td>For farming purposes</td>
<td>Never legal to ride on the road</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

All data collected are considered front end or pre-test data for this study. Once these data have been collected presenters ask audience participants to set aside the automated response devises.
and the STARs presentation is given to those in attendance.

At the end of the presentation attendees are asked to once again utilize the automated key pad devices to answer the same knowledge questions that were given prior to the presentation. The audience is then given a post-test. Questions eight, nine, and eleven from the pre-test are repeated and data are recorded to evaluate if there is an immediate increase in knowledge. The post-test is followed by one question related to ATV safety attitudes and behaviors.

“Because of what you learned in this presentation will you change anything before riding an ATV?”

The audience can answer along a sliding scale of 1 – 5, one being yes they will definitely change some behavior, two they might change some behavior, three being neutral, four unlikely to change any behaviors, and five being no they will not change any behaviors. Again data were once again gathered to indicate an immediate gain in ATV safety knowledge and to see if attendant’s attitudes had improved regarding riding habits. All data collected at school presentations is compiled for comparison. This data is front end data or pre and post data sets for the study.

Six to nine month following the STARs safety presentation a follow-up survey was distributed to each school where a presentation had been given. The follow-up surveys were to be administered by teachers, administrators or school nurses to only those who had attended the original presentation in order to gather post/post data for evaluation of long term retention of knowledge and whether the STARs education program had effectively made a lasting change in knowledge and safe riding habits by the attendees for when they are exposed to riding an ATV.

**ANALYSIS**

To describe the student population who was educated with STARs, (Table 1) descriptive statistics on age and gender were examined to see if there was a significant change in knowledge
from pre-test to immediate post-test, and 6-9 month post/post-test. Students were scored on their knowledge of ATV recommendations and laws at each assessment with a minimum score of 0 (no correct knowledge) and a maximum score of 3 (all knowledge questions correct). Comparisons are made from pre-test on the proportions of students getting each of the three knowledge questions correct. This categorical data were analyzed using the Pearson Chi-square test. A p-value of < .05 was considered significant as the results are likely not to chance.

To examine if the 6-9 month follow up survey or post/post-test sample was representative of the original sample, an examination of the difference in the proportion of students in the original sample to the 6-9 month post/post-test sample was made by demographic (Table 2).

**RESULTS**

**Participants**

The participants in the current study were comprised of students participating in STARs presentations from September of 2011 through May of 2012, from 9 rural schools in 9 counties of Eastern Iowa. A total of 1788 youth received the STARs education.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Original Sample (N, %)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
</tr>
<tr>
<td>Male</td>
<td>849</td>
</tr>
<tr>
<td>Female</td>
<td>825</td>
</tr>
<tr>
<td>Ever ridden an ATV</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1344</td>
</tr>
<tr>
<td>No</td>
<td>219</td>
</tr>
<tr>
<td>Pre-test Age</td>
<td></td>
</tr>
<tr>
<td>&lt;11</td>
<td>96</td>
</tr>
<tr>
<td>11</td>
<td>207</td>
</tr>
<tr>
<td>12</td>
<td>385</td>
</tr>
<tr>
<td>13</td>
<td>431</td>
</tr>
<tr>
<td>14</td>
<td>217</td>
</tr>
<tr>
<td>15</td>
<td>167</td>
</tr>
<tr>
<td>16</td>
<td>118</td>
</tr>
<tr>
<td>&gt;16</td>
<td>126</td>
</tr>
</tbody>
</table>
Of the original sample 1015 completed the 6-9 month post/post-test. The 6-9 month post/post-test did not differ significantly from the original sample on gender, age or having ever been exposed to an ATV.

**Table 4 Percent of original sample completing follow up survey**

<table>
<thead>
<tr>
<th>Gender</th>
<th>6-9 month follow-up (N, %)</th>
<th>% of original sample completing 6-9 month follow up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>511 50.9</td>
<td>60.2</td>
</tr>
<tr>
<td>Female</td>
<td>493 49.1</td>
<td>59.8</td>
</tr>
<tr>
<td>Ever ridden an ATV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>821 81.3</td>
<td>61.1</td>
</tr>
<tr>
<td>No</td>
<td>189 18.7</td>
<td>86.3</td>
</tr>
<tr>
<td>6-9 month follow-up Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;11</td>
<td>35 7.5</td>
<td>78.1</td>
</tr>
<tr>
<td>11</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>133 13.3</td>
<td>64.3</td>
</tr>
<tr>
<td>13</td>
<td>379 37.8</td>
<td>98.4</td>
</tr>
<tr>
<td>14</td>
<td>276 27.5</td>
<td>64.0</td>
</tr>
<tr>
<td>15</td>
<td>56 5.6</td>
<td>25.8</td>
</tr>
<tr>
<td>16</td>
<td>56 5.6</td>
<td>33.5</td>
</tr>
<tr>
<td>&gt;16</td>
<td>28 2.8</td>
<td>23.7</td>
</tr>
</tbody>
</table>

Attendees of the STARs presentation are taught about risks associated with ATV riding and possible outcome of risky behaviors. Additionally, participants of the program are instructed on knowledge to enable them to minimize the impact or exposure to injury. The overreaching goal of the STARs program is to enable youth to make better informed risk taking decisions. Very few students had knowledge of ATV recommendation before the STARs presentation.

Following the STARs presentation, students increased their knowledge both immediately in the post-test and in the long term post/post-test. Table 3 represents the significance of knowledge gained and retained over time by those who attended the STARs presentation.
Table 5 Knowledge data for schools

Percent of students that answered correctly on each knowledge question at pre-test, post-test, and 6-9 month follow-up among nine rural schools in Iowa.

<table>
<thead>
<tr>
<th></th>
<th>Pre-test (N=1788)</th>
<th>Immediate Post-test (N=1788)</th>
<th>p-value*</th>
<th>6-9 month follow-up post/post-test (N=1015)</th>
<th>p-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATVs are designed to carry how many people</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correct</td>
<td>N</td>
<td>Col%</td>
<td></td>
<td>N</td>
<td>Col%</td>
</tr>
<tr>
<td></td>
<td>887</td>
<td>52.2</td>
<td></td>
<td>1544</td>
<td>92.5</td>
</tr>
<tr>
<td></td>
<td>787</td>
<td>77.5</td>
<td>.0001</td>
<td></td>
<td>.0001</td>
</tr>
<tr>
<td>Incorrect</td>
<td>812</td>
<td>47.8</td>
<td></td>
<td>7.5</td>
<td>22.5</td>
</tr>
<tr>
<td>Largest engine size for a 12-15 year old</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correct</td>
<td>N</td>
<td>Col%</td>
<td></td>
<td>N</td>
<td>Col%</td>
</tr>
<tr>
<td></td>
<td>429</td>
<td>25.7</td>
<td></td>
<td>1342</td>
<td>79.1</td>
</tr>
<tr>
<td></td>
<td>449</td>
<td>44.3</td>
<td>.0001</td>
<td></td>
<td>.0001</td>
</tr>
<tr>
<td>Incorrect</td>
<td>1239</td>
<td>74.3</td>
<td></td>
<td>354</td>
<td>20.9</td>
</tr>
<tr>
<td>When can someone ride an ATV on a public road</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correct</td>
<td>N</td>
<td>Col%</td>
<td></td>
<td>N</td>
<td>Col%</td>
</tr>
<tr>
<td></td>
<td>780</td>
<td>46.8</td>
<td></td>
<td>1328</td>
<td>78.7</td>
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<tr>
<td></td>
<td>586</td>
<td>57.8</td>
<td>.0001</td>
<td></td>
<td>.0001</td>
</tr>
<tr>
<td>Incorrect</td>
<td>886</td>
<td>53.2</td>
<td></td>
<td>359</td>
<td>21.3</td>
</tr>
</tbody>
</table>

Immediately after the STARs presentation, almost 93% of all students knew the correct number of riders for an ATV, almost 80% of all students knowing the correct engine size for 12 – 15 year old, and almost 80% know the correct answer for when it is legal to operate an ATV on a public road. This continued for the post/post-test with over 75% reporting the appropriate number of riders for an ATV, close to 45% remembering the correct engine size for 12 – 15 year olds, and nearly 60% knowing when it is legal to operate an ATV on a public road (P<.0001 compared to pre-test). Based on the data collected there was a significant difference in knowledge between the pre and post-test, and this knowledge is being retained over time. While the percentage of those retaining the knowledge over time decreases slightly, the program still significantly impacted knowledge in a meaningful number of students.
DISCUSSION

This study suggests that the STARs educational program does in fact increase knowledge immediately following the program and 6-9 months later. Data collected provides evidence of an increase in cognizance of 1) how many riders and ATV is designed to carry from 52% to 93% directly after the presentation, and 78% retaining the knowledge; 2) the largest engine size for a 12 – 15 year old from 25% to 79% directly after the presentation, and 44% retaining the knowledge; and 3) when someone can ride an ATV on a public road from 46% to 79%, and 58% retaining the knowledge, representing a high level of information retention.

Compared to other ATV educational programs, the STARs educational program incorporates many aspects of other safety programs, but also adds new elements in order to provide for greater understanding on what can be done to be safe when riding an ATV. The combination of all the elements of this educational safety program increases remembering of safety knowledge and strategies for what can be done in order for an ATV to be ridden safely.

TRUSTWORTHINESS

By using automated key pad clickers during the time of the STARs program presentation pressures associated with their identity being known was removed. Further, some individuals that participated in the original ATV safety program may have missed the follow up survey due to illness and other factors. There may also have been a limited number of follow-up survey participants that did not take part in the original ATV safety presentation, though teachers, school nurses, and administrators were reminded not to provide the follow-up survey to any student who was not at the original ATV safety presentation.

CONCLUSION

The Stars educational program is aimed at making an impact on young people who are
riding or presented with an opportunity to ride an ATV. Because of the way the safety message is presented it has meaning and those who receive the STARs program retain ATV safety knowledge over an extended period of time. While presenters of this ATV safety program know that there will still be ATV crashes, it is hoped that youth will remember the safety tips when they are faced with making a decision about how they ride or are presented the opportunity to ride an ATV. This study indicates that ATV presenters should be encouraged that the information they distribute will have a positive and lasting impact on education recipients. This should enable youth to make better choices in how they ride an ATV, and that there may be fewer fatalities because of being a recipient of this educational program.
REFERENCES


APPENDIX A
6-9 MONTH FOLLOW UP LETTER

<Date>

<Name>
<Title>
<School Name>
<School Street Address>
<City, State, Zip Code>

Dear <Name>:

The University of Iowa Children’s Hospital and Kohl’s Keeping Kids Safe: Safety Tips for ATV Riders educational program team would like to take this opportunity to thank you for allowing us to present our ATV safety program last year. As you may recall, we collected information from the students regarding ATV safety knowledge and riding behaviors, before and directly after our presentation. It would be of great benefit for us to learn if this knowledge has been retained and if any ATV riding behaviors have been modified because of our presentation.

Enclosed you will find paper copies of the follow up survey I would ask that you administer to only those who attended last year’s ATV safety presentation. I have organized them in packets of 30 surveys each, hoping that will make the job easier passing it off to the instructor that will be distributing them to the students. I don’t anticipate students needing to spend more than five minutes to complete the survey. I understand that some of the students that heard our presentation last spring have moved to a different school because of their grade. It would be great if those students could also get a copy of the survey. I have gone ahead and included those if you have the ability to get the surveys to them.

I have also enclosed a self-addressed envelope to return the surveys so that we can enter the data into our data base and see if our program is in fact making a difference. Thank you for your help in administering this follow up survey. I look forward to sharing our data with you sometime in the future.

If you have any questions about this, please don’t hesitate to contact me at either Jeffrey.H.Peck@usace.army.mil or 319-338-3543 extension 6310.

Sincerely,

Jeffrey H. Peck
Natural Resource Specialist/Ranger
ATV Task Force Member
U.S. Army Corps of Engineers

Pam Hoogerwerf
Co-Director, UICH
Kohl’s Keeping Kids Safe
ATV Program

Kristel Wetjen, BSN
Co-Director, UICH
Kohl’s Keeping Kids Safe
ATV Program
APPENDIX B
FOLLOW UP SURVEY

1) How Many people is an ATV designed to carry? _____________________

2) What is the proper size ATV for 12-15 year olds to ride?
   a. 70cc or less
   b. 70-90 cc
   c. 90 cc or greater
   d. I don’t remember

3) When is it legal to ride an ATV on a roadway? _______________________

4) How often do you ride an ATV?
   1-3 times a week _____
   1 time a week _____
   1-3 times a month _____
   1-5 times a year _____
   Never Ride an ATV _____

5) Since the STAR’s presentation have you changed any of your riding behaviors? Yes _____ NO _____ Sometimes _____

   If so can you please explain what behaviors you changed?
   __________________________________________________________________________
   __________________________________________________________________________
   __________________________________________________________________________

6) Since the STAR’s presentation have you been involved in an ATV crash?
   Yes ____ NO ____
   IF YES PLEASE EXPLAIN:
   __________________________________________________________________________
   __________________________________________________________________________

7) Do you think the STAR’s program is beneficial in teaching ATV safety?
   Yes____NO____
   IF YES PLEASE EXPLAIN:
   __________________________________________________________________________
   __________________________________________________________________________