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Assuring Youth Raising Livestock for Food Produce a Quality Product

Jamie L. Fassett

New Mexico Institute of Mining and Technology

Rosemarie A. Nold

University of Nebraska- Lincoln, rnold1@unl.edu

S Kay Rockwell

University of Nebraska- Lincoln, krockwell1@unl.edu



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Abstract

The Nebraska 4-H Assuring Quality program was developed to help youth producers understand responsibilities of raising livestock for food, increase technical knowledge of quality assurance practices, and implement those practices. Participants' knowledge, attitudes, and practices were determined by surveying parents using a post-then-pre method. Mean retrospective pre-scores showed that youths significantly increased their knowledge, positively changed their attitudes, and implemented better quality assurance management practices in each of the five subject areas taught: (a) quality assurance concepts, (b) feeding and watering, (c) animal identification, (d) housing and facilities and (e) prevention of problems.

Jamie L. Fassett

Reporting Specialist
Academic Affairs
New Mexico Institute of Mining and Technology

Rosemarie A. Nold

Youth Animal Science Extension Specialist
University of Nebraska-Lincoln
Lincoln, Nebraska
rnold1@unl.edu

S. Kay Rockwell

Professor
University of Nebraska-Lincoln
Lincoln, Nebraska
krockwell1@unl.edu

Introduction

Quality Assurance Programs

Research from National Pork Producers Council (NPPC) and National Cattlemen's Beef Association (NCBA) indicates voluntary on-farm quality assurance practices have a positive effect on the quality and safety of food (NCBA, 1995; NPPC, 1999). Since the inception of quality assurance programs, there has been a decrease in violative tissue residues, injection-site lesions, and major and critical bruises, and an overall increase in high-quality products (NCBA, 2002; Honeyman, 1996).

Quality assurance, a general term used to describe voluntarily implemented practices, helps ensure consumers receive a wholesome and safe product. An initiative of the United States Department of Agricultural-Food Safety Inspection Service (USDA-FSIS) is to work with producers to implement on-farm food safety measures. Producer practices can be changed with industry-driven voluntary quality assurance programs (Lautner, 1995). Therefore, quality assurance programs provide the foundation for pre-harvest food-safety initiatives.

The Washington Animal Production Food Safety Outreach Partnership Project report to FSIS (2001) stated most food safety and quality assurance efforts are focused on large-scale livestock producers. However, they recognized that outreach programs should also target small producers, including 4-H and FFA members and leaders.

National Institute for Animal Agriculture (NIAA) reported that, "nearly one percent of the animals produced in the United States entering the food chain are marketed through youth livestock program auction sales" (2003). Although this appears to be a small percentage of food products entering the market, NIAA states it is enough to cause public concern if wholesomeness is compromised. This could ultimately jeopardize consumer confidence in the entire livestock industry.

It is important that youth producers adhere to the same or similar quality assurance standards as large-scale livestock producers. In an effort to address quality assurance and ethical issues, many state 4-H programs have implemented educational efforts for youths (Goodwin, Murphy, & Briers, 2002). These efforts range from developing and making resources readily available to mandatory training.

Nebraska 4-H Assuring Quality Program Background

In 2002, a quality assurance educational program for youths was implemented by Nebraska 4-H in an effort to help youth producers understand the responsibilities of raising livestock for food. The Assuring Quality program targets 4-H members with beef, sheep, swine, dairy, and dairy goat projects. Educational focus varies by age. Members ages 8 to 11, who want to show at fairs, are required to attend yearly training sessions until they reach the age of 12. Older youths can continue to attend training sessions, assist an adult in conducting training sessions, or pass knowledge tests.

Three modules were taught in rotation over a 3-year time frame. Module topics for Assuring Quality included a) daily care and management and prevention of problems, b) animal handling and carcass quality, and c) proper use of medications and animal health products (Nold, 2002a). Delivery of the training ranged from multiple 1-hour workshops in clubs to full-day county or regional workshops.

Module one of Assuring Quality curriculum included an introduction to the concepts of quality assurance: what it means, why it is important to a youth producer, and its relationship with food safety and consumer confidence. Lessons specific to daily care and management included feeding and watering of animals, animal identification, and housing/facilities. Lessons in prevention focused on proactive ways to avoid potential problems that affect the health of animals and product quality. Curriculum included techniques such as developing plans for feeding and vaccinations, avoiding contamination of feeds and paying attention to early signals from unhealthy animals.

Assuring Quality was designed as an experiential learning process (Nold, 2002b). Experiential learning emphasizes exploration and critical thinking and focuses not only on learners doing work, but also on sharing, processing, analyzing and applying the knowledge or skills gained (Walker and Dunham, 1994). Boyd (2001) describes the steps in experiential learning as experience, sharing, processing, generalizing and applying. The Assuring Quality Program assists young persons in moving through these steps. The application of the training is a daily process for most 4-H members with livestock projects.

Evaluation of Youth Quality Assurance Programs

Numerous quality assurance educational materials have been developed or adapted for youth audiences (Animal Welfare Information Center, 2002), yet very few formal evaluations have been conducted regarding effectiveness of the programs.

A national study conducted by Goodwin, Murphy, and Briers (2002) evaluated the ethical cognition effects of the educational video "Line in the Sand." More than 900 individuals involved with livestock shows, including 4-H members, either viewed the video (treatment) or did not view the video (control) prior to answering the questions. The authors concluded that there was a "statistically significant difference between the control and treatment groups ability to correctly sort the eight livestock showing practices."

At a statewide level, Nold and Hanson (2001) evaluated youth pork producers' knowledge of quality assurance practices by testing participant knowledge before and after training. They reported a significant increase in knowledge of all areas tested, including injection site placement and withdrawal times. In a county-level program where youth participants were taught good production practices, pre- and post-tests indicated an increase in knowledge of 17% (Mitchell, 2001). The curriculum included explaining the links of the food chain, milk residues, and antibiotics, and how to give an injection to livestock properly.

Because of limited research available on effectiveness of these programs and the increasing emphasis on quality assurance and ethics across states, there was a need to identify whether the training programs can have an impact on knowledge, attitudes, skills and behaviors. The Nebraska 4-H Assuring Quality program was evaluated to determine if it taught youth basic concepts, created a more positive attitude toward raising a safe, quality food product for consumers and influenced the way they care for their animals.

Materials and Methods

Instrument

Parents' perceptions of their child's gain in knowledge, attitude about quality assurance practices, and care of their livestock were evaluated using a retrospective pre-test. A retrospective pre-test or post-then-pre method of evaluation is described by Lynch (2002) as a self-report measure of program impact where participants serve as their own baseline. Participants are first asked to rate their knowledge and skills gained from the program and then rate how they perceived their knowledge and skills prior to the program (Rockwell & Kohn, 1989).

The test included the date the child participated in the workshop and the parents' observation of their child's knowledge, attitude, and livestock care practices, before the training and 1 year later. Questions included knowledge, attitude, and behavior/practice items.

Fifteen knowledge items were grouped into five categories: quality assurance concepts, feeding and watering, identification, housing and facilities, and prevention management. Using a Likert scale, the parents rated their child's knowledge and understanding as definitely knows/understands, probably knows, probably does not know, or definitely does not know.

Three attitude items addressed quality assurance concepts. Using Likert scale responses, the parents rated if their child definitely agreed, probably agreed, probably did not agree, or definitely did not agree.

Twelve behavior/practice items were grouped into four categories: feeding and watering, identification, housing and facilities, and prevention management. Using Likert scale responses, the parents rated if their child almost always implemented the practice, often implemented the practice, sometimes implemented the practice, or almost never implemented the practice.

Sample

Over 6,550 youths participated in the 2002 Quality Assurance Program, with 2,870 that fit within the target population of youths ages 8 to 11. A sample of 400 youth ages 8-11 who participated in 1-day workshops taught by Extension educators in spring 2002 was randomly chosen in a stratified, cluster design. The survey was mailed to parents of the sample with two follow-ups. Parents were invited to include their child in assisting them with the survey. The overall return rate from the sampled parents was 40%. Slightly more than half (59%) of the parents indicated that their child assisted with the completion of the survey.

Data Analysis

To assess the reliability of items used in the questionnaire, a coefficient of internal consistency was calculated using Cronbach's alpha methodology. The overall Cronbach's alpha was .90 for the 20 subject matter items, indicating responses were consistent across items. Within subscales, the Cronbach's alpha values were .85 for knowledge, .65 for attitudes, and .78 for practices. Appropriate items were combined for each of the concepts addressed, and a paired t-test was used to identify differences between pre- and post-training. A probability level of .01 was used to determine significance. The LS Means indicating practical differences in the knowledge and attitude categories was .75. Because changes in behavior or practices implemented need to be observed over an extended period of time, an LS Means of .5 was used to indicate a practical difference in that category.

Results

Knowledge Gained

Results indicate a significant increase in the youths' knowledge in all five areas as reported by parents (Table 1). The greatest increase in the youth participant knowledge was in quality assurance concepts, with a difference of .88 (on a scale of 1 to 4) between the mean pre and post scores. The smallest, yet still significant, increase was in the subject area of housing and facilities.

Table 1.
Participants' Knowledge About Acceptable Quality Assurance Practices

Subject area	Pre score M ^a	Post score M ^a	Diff LS Means	df	t-value
Quality assurance concepts (n=140)	2.70	1.82	0.88	135	13.69*
Feeding and watering (n=141)	2.61	1.93	0.68	137	11.85*

Animal identification (n=139)	2.42	1.64	0.78	136	12.59*
Housing and facilities (n=140)	1.99	1.44	0.55	136	10.55*
Prevention of problems (n=134)	2.47	1.73	0.74	132	12.86*
^a Means calculated from a scale where 1 = Yes definitely, 2 = Yes probably, 3 = No probably not, and 4 = No definitely not. * $p < .01$					

Results indicate a significant increase in youth participants' knowledge in each of the five subject areas of the Assuring Quality curriculum. These results are consistent with Mitchell (2001) and Nold and Hanson (2001), who reported increases in knowledge from a quality assurance program piloted at the county level and statewide youth pork quality assurance training, respectively.

Attitudes Changed

Youths increased knowledge of quality assurance concepts contributed to an attitude change regarding the responsibilities involved with raising livestock for food and the importance of quality assurance (Table 2). A mean difference of .76 ($p < .01$) between pre and post score means on attitude questions was found. This represents a positive change in attitudes about the responsibilities associated with producing a food.

Table 2.
Participants' Attitudes About Acceptable Quality Assurance Practices

Subject area	Pre score M ^a	Post score M ^a	Diff LS Means	df	t-value
Quality assurance concepts (n=135)	2.42	1.66	0.76	133	12.25*
^a Means calculated from a scale where 1 = Yes definitely, 2 = Yes probably, 3 = No probably not, and 4 = No definitely not. * $p < .01$					

Practices Implemented

Parents' observations of their child's use of quality assurance skills were surveyed in the areas of feeding and watering, animal identification, housing/facilities, and prevention management. Results indicated a significant increase in youth conducting practices that were consistent with quality assurance standards taught in the program (Table 3). The largest difference between the pre and post mean scores for practices were found in the subject area of identification followed by prevention of problems. The smallest amount of difference was found in the area of feeding and watering.

Table 3.
Participants' Implementation of Acceptable Quality Assurance Practices

Subject area	Pre score M ^a	Post score M ^a	Diff LS Means	df	t-value
Feeding and watering (n=136)	2.04	1.77	0.28	123	7.03*

Animal identification (n=135)	2.89	2.30	0.58	131	10.1*
Housing and facilities (n=133)	1.96	1.65	0.31	125	6.63*
Prevention of problems (n=126)	2.59	2.16	0.43	132	12.86*
<p>^a Means calculated from a scale where 1 = Almost always, 2 = Often, 3 = Sometimes, and 4 = Almost never. *$p < .01$</p>					

Impact of Program

Knowledge Gained

The amount of change in knowledge about quality assurance practices was greatest for quality assurance concepts and least for housing and facilities. Based on mean differences of pre and post scores, the rank order of most to least change was (a) quality assurance concepts, (b) animal identification, (c) prevention of problems, (d) feeding and watering, and (e) housing and facilities. This order can be associated with the youth's familiarity with curriculum concepts and daily use of skills prior to participating in the Assuring Quality program.

Parents indicated that their children had the least amount of knowledge about quality assurance concepts prior to attending the program and thus gained the most knowledge in this area. On the opposite end, pre scores show that youth had more knowledge of the environmental needs of animals and basic nutritional requirements prior to training, and so, while their knowledge still increased, it was to a lesser degree. This contributes to the concept that youth livestock producers are involved in the daily care of their animals. However, the significant gains in this area show that even with pre knowledge, youth can benefit from the Assuring Quality curriculum.

Attitude Change

By participating in the Assuring Quality program, youths ages 8-11 improved their attitudes about their responsibility for producing a safe wholesome food product for consumers. The positive change in participants' attitude about responsibilities of raising livestock supports Ward (1996), where 4-H Alumni indicated the animal science projects had a positive influence on their ability to accept responsibility.

One primary goal of the program was to "help youth understand the responsibilities involved in raising livestock for food" (Nold, 2002b). The change of attitude, as indicated by the difference in mean scores, justifies that Assuring Quality participants are beginning to understand their responsibilities of producing a safe, wholesome food product. With exposure to quality assurance concepts and practices, youth producers begin to understand their role in the food production process and that they can have an impact on the livestock industry.

Behavior Change

After participating in Assuring Quality, youths ages 8-11 implemented management practices that were consistent with quality assurance standards taught regarding properly identifying their animals, practices in prevention management, and daily care of their animal's nutritional and environmental needs. This indicates youths' uses of management practices were more closely aligned with quality assurance standards after training. Subject areas within the Assuring Quality curriculum that involved practices that youths could incorporate into their projects were: feeding and watering, animal identification, housing and facilities, and prevention of problems.

Knowledge gains and attitude changes are often evaluated and seen in youths from their participation in 4-H programs (Gamon & Dehegedus-Hetzel, 1994; Goodwin, Murphy & Briers, 2002; Mitchell, 2001; Nold & Hanson, 2001). However, uses of skills and implementation of practices are less often reported and evaluated. In the study reported here, results indicate participants utilized the skills acquired by applying them to their 4-H livestock project over the year that expired between the training and the time of evaluation.

Synthesis of Knowledge, Attitudes, and Practices

When comparing the indicators of knowledge, attitudes, and practices, the differences in mean retrospective pre and post scores were smallest for practices. This is consistent with expectations that knowledge and attitudes are more easily changed and evaluated than practices. Rockwell and

Bennett (2000) explain that intermediate outcomes (knowledge gained/retained and attitudes changed) can occur fairly quickly compared to practices that lead to longer term social, economic, and environmental changes, which can take years to assess.

Summary

By participating in Assuring Quality, youths ages 8-11 first gained knowledge about quality assurance and animal care, changed their attitudes about the responsibility involved with raising livestock for food, and then implemented practices consistent with quality assurance standards.

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