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Engaging Native American Students in Research Methodology

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Abstract

The purpose of this project was to provide a learning experience for American Indian/Alaska Native (AIAN) undergraduate students participating in a summer academic enrichment program, Native Americans into Medicine (NAM). Through NAM, operated by the Center of American Indian and Minority Health, students learned quantitative and qualitative research skills. They applied these skills through the development of a culturally relevant survey to measure commercial tobacco use in AIAN teens and analysis of the survey results.
In phase/year 1, students learned qualitative research methods and interviewed participants of a regional Tribal community powwow to inform the cultural adaptation of the National Youth Tobacco Survey. In phase/year 2, students learned about quantitative research methods by conducting a cross-sectional study in which the survey was distributed to rural Minnesota schools to assess tobacco attitudes, use, intent to use, and factors influencing tobacco use in AIAN youth. NAM participants then analyzed the survey data. Benchmarks for student success included developing a tool to assess tobacco use in AIAN youth, conducting the study, and disseminating results.
At the pow wow in year 1, 26 youth (ages 12 to 18) who self-identified as AIAN were recruited to participate in cognitive interviews. Student researchers reviewed each survey question for possible revision and inclusion in the final survey. In year 2, completed surveys were obtained from 281 (15% of eligible) students from 5 schools; 256 surveys were usable. Thirty-one percent (n = 80) of students self-identified as AIAN; 56% were male. Students' mean age was 15.8 years. Thirty-eight percent had tried cigarette smoking, even one or two puffs, or had vaped. As a cohort, students presented research results to health directors and providers at 2 tribal clinics.

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This 2-year cohort approach to teaching qualitative and quantitative research skills to AIAN students was successful by internal benchmarks—namely, student researchers developed, implemented, and analyzed a survey appropriate for AIAN high school students, and all student researchers presented their research results at least once.

BACKGROUND

The University of Minnesota Medical School's (UMMS) Duluth campus was founded in 1972 to be a leader in educating physicians to practice in rural Minnesota and American Indian/Alaska Native (AIAN) communities. Originally a stand-alone medical school for years 1 and 2, the Duluth campus was merged to become a regional medical campus of the University of Minnesota. As defined by the Liaison Committee on Medical Education, a regional medical campus (RMC) is "an instructional site that is distinct from the central/administrative campus of the medical school and at which some students spend one or more complete curricular years."[1] The number of RMCs in the United States has grown to meet the increased demand for physicians and to meet unique RMC research and education missions. Scholarly activity is expected of faculty and students at RMCs. Cathcart-Rake and Robinson (2018) argued that scholarship should be more broadly defined to accommodate the unique mission-specific scholarship that is undertaken at RMCs.[2]

The Center of American Indian and Minority Health (CAIMH), housed in the UMMS located on the Duluth campus, reinforces the school's mission by recruiting AIAN medical students and supporting them academically and socially through their first 2 years of medical school. Support includes academic tutoring if needed, advocating for student needs, providing referrals to different academic and health services, and offering a physical and emotional space for community building. CAIMH also develops and administers educational pathways to health profession programs. The oldest of the pathway programs, Native Americans into Medicine (NAM), is a 6-week summer academic enrichment program for AIAN college sophomores and juniors pursuing health-related careers. In the program, students learn and apply Indigenous-based research practices while studying current issues in AIAN health.
Indigenous research methodologies model best practices for conducting research with AIAN communities and can challenge the colonial notions of knowledge systems and methodologies that have been prevalent in academia.[3-5] Historically, research conducted by academic investigators in Tribal communities has lacked respect and relevance, furthering distrust similar to that seen in health care.[3] Through training in Indigenous research methodologies, research faculty and students learn how to engage communities in a respectful and relationship-sustaining manner. Centering Indigenous approaches and knowledge to address community needs empowers students and builds Tribal research capacity.[3,5-7] Another key element to this approach is the accountability of the researcher and the institution to the community. Data and results are shared and controlled by the community, supporting sovereignty and self-governance.[3-7] The goal of this article is to describe a tobacco research project initiated by NAM with a cohort of AIAN students. One of the main aims of the tobacco research project was to teach NAM students about Indigenous research methodologies, then have them apply the methodologies within the community-informed project, with all data owned by the specific participating Tribal communities.

COMMERCIAL TOBACCO IN INDIAN COUNTRY

Tobacco use among youth was the primary focus of the NAM research project. One of the first discussions with the NAM cohort included an acknowledgment of the distinction between traditional and commercial tobacco for those who are unfamiliar with the role and influence in many AIAN communities. Understanding the cultural significance of traditional tobacco and how it differs from commercial tobacco is essential to crafting a culturally appropriate evaluation tool and commercial tobacco cessation programs. A traditional tobacco is any tobacco used in a long-established, customary way that often maintains a spiritual aspect, especially in many AIAN cultures.[8] These practices, as well as the plants used as tobacco, vary by region and cultural group.[8] In

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Minnesota, *asemaa* (Ojibwe) and *cansasa* (Lakota) are both common words used for traditional tobacco. Kinnikinnick is a mixture of tobacco with other plant materials, literally translating to "that which is mixed."[8] Commercial tobacco is also occasionally used for ceremonies. Traditional tobacco has great cultural and spiritual meaning to many of the investigators, while commercial tobacco is a catalyst for many of the disparities seen in AIAN communities. The significance of this distinction was at the heart of the motivation for conducting the project.

In addition to understanding differences between traditional and commercial tobacco, the impact of commercial tobacco used and health disparities in general were important topics within the NAM program. The life expectancy for AIAN individuals is 5 years less than the life expectancy of members of the overall population and is the lowest in the United States.[9,10] Higher rates of commercial tobacco use in the AIAN population contribute to increased rates of chronic lung disease, lung and other forms of cancer, and diabetes, all of which decrease the overall life expectancy for AIAN populations.[11,12] The Centers for Disease Control and Prevention (CDC) reports that AIAN have higher rates of cigarette use than other ethnic and racial groups. Reducing commercial tobacco use among AIAN offers the potential to reduce the amount of commercial tobacco–related deaths and to raise AIAN life expectancy.[11] An understanding of AIAN youth commercial tobacco use and exposure could illuminate ways to encourage cessation earlier in life.

While cigarette use remains a concern, electronic tobacco devices (i.e., vapes, JUULs, Mods, or other e-cigarettes) are now causing increased rates of tobacco use, primarily among adolescents and young adults. E-cigarettes, vaping, and JUUL use are forging a pathway for the renormalization of smoking and an increase in overall prevalence of tobacco use.[13,14] The NAM cohort was particularly interested in these new ways of consuming tobacco among AIAN youth. Considering the cultural relevance of traditional tobacco, the high prevalence of commercial tobacco use among many AIAN communities, and the rise in e-cigarette use among youth in general, the NAM cohort worked with faculty to develop a survey tool to better understand this health issue and potential outcomes in AIAN communities. Within this research, the NAM students were able to not only better understand a health disparity but also become more engaged as AIAN student researchers in a culturally significant and meaningful experience.

METHODS

This project is an example of a research product that was initiated and subsequently completed by a cohort of undergraduate AIAN students and that aligns with the unique mission of a regional campus at UMMS in Duluth. The research project involved 17 student researchers who participated to increase their research knowledge and skills, develop an interest in research, and refine an instrument to assess traditional and commercial tobacco use among AIAN high school students. (A detailed description of the summer research program and the students is outlined in a complementary article titled "Native Americans into Medicine*:* A Program Focused on Developing Representation and Diversity in Health Care," published in this same issue of *Journal of Regional Medical Campuses*.)

The study was conducted in 2 phases over 2 summer sessions: (1) development of the method for the study, including refining the instrument, and (2) data collection and analysis of survey results. The project received approval through the University of Minnesota Institutional Review Board (IRB); all students completed Collaborative Institutional Training Initiative (CITI) training. One Tribal community also required tribal IRB approval of the project and the final manuscript of this article before submission. Additionally, 7 Tribal chairpersons received a letter explaining the project and were notified that they may have Tribal members attending public schools where the survey was being implemented.

Phase 1: Developing the Study Method

Refining the National Youth Tobacco Survey and Experiential Learning in Qualitative Research Method, Summer 1

Year 1 focused on learning basic research methods, with a focus on qualitative research. Student researchers conducted a review of the literature regarding youth tobacco use and traditional and commercial tobacco use by AIAN and spoke with a tribal Elder regarding traditional tobacco. The

research team selected the National Youth Tobacco Survey (NYTS),[15] developed by the CDC to measure youth tobacco use and the impact of efforts to reduce tobacco use, as the basis for this study. They attempted to keep many of the questions and the format similar to the CDC and Minnesota Student Survey (MSS)[16] to be able to compare results. Student researchers developed a plan to refine the survey based on (1) a review of the literature and their own lived experiences, which led to a shortened version of the NYTS; and (2) cognitive interviews with youth in a Tribal community to ensure clarity and cultural sensitivity of items in the shortened version.[15] Student researchers created a semi-structured interview schedule to guide the cognitive interviews. They also completed training composed of role-playing and didactic information about cognitive interviewing and qualitative data analysis.

Phase 1 Sample

Cognitive interviews were conducted in one rural, Tribal community during a pow wow. Twenty-six youth ranging between 12 and 18 years of age who self-identified as AIAN were recruited to participate in the cognitive interviews. Parents signed parental consent forms; verbal consent to participate was obtained from youth.

Phase 1 Data Collection

Three researchers conducted each interview, 2 of whom recorded youth responses; the third facilitated the interview, guided by the cognitive interview schedule. Interviews were also audio recorded. The length of interviews varied widely, from 2 minutes to 17 minutes. Each interview was coded so the taped interview and notes for each participant could be linked but still maintain anonymity. Youth were thanked for their participation with a $25 gift certificate and prayer ties that NAM student researchers dried and packaged from locally picked tobacco plants. Data (recordings and notes) were stored electronically in a secure database and on password-protected devices. Paper surveys were kept in a secured drawer in a secure office.

Phase 1 Data Analysis

Results of interviews were summarized to guide instrument development. All responses to each item were placed in a Word document table. The comments were then coded by type of comment, youth appraisal of survey, information about the youth making the comment, and notes made by researchers during the process of summarizing student comments (see Table 1). Finally, as a group, student researchers reviewed each survey item and made a recommendation about revisions and whether to include the item in the final survey (survey available upon request).

Phase 2: Cross-Sectional Survey With High School Students

The second phase of the project, a cross-sectional study focused on quantitative methods, surveyed youth in rural Minnesota schools regarding tobacco attitudes, use, intent to use, and factors influencing tobacco use. Based on the semi-structured interviews, changes were made to the existing NYTS survey. Changes made to the survey based on this input are considered minor and included removing questions not relevant to tobacco use (e.g., questions on marijuana) and demographic questions to fit with the MSS. Three questions were added about use of traditional tobacco, and one question specific to vaping was added. We also added a question about vaping by using just the juice, on the advice of the teen reviewer.

Phase 2 Sample

Minnesota high schools whose student population included at least 15% AIAN students were identified, based on data from the Minnesota Department of Education Report Card. Twenty-four high schools were invited to participate. Letters were sent to each school's principal; research staff then contacted each school by phone. Five schools located in Minnesota agreed to participate; the communities were a mix of town and rural populations, which aligns with the mission of the Duluth campus.[16]

Phase 2 Instrumentation and Data Collection

University of Minnesota faculty and student researchers created a work group to revise the NYTS based on feedback from cognitive interviews and review by two groups of experts: (1) NAM student researchers and (2) academic, public health, and medical professionals. Finally, a high school student not previously affiliated with the study completed the survey to assess language clarity and relevance of

terminology. As a result, additional language regarding e-cigarettes was added regarding the frequency of using e-cigarette juice without the electronic devices. The 52-item survey was then programmed into Qualtrics™ and piloted with 5 high school students located in an urban area in Minnesota, resulting in minor grammatical changes to the survey. The link to the Qualtrics survey was sent to each of the 5 participating schools for their review. NAM faculty and staff administered the survey to students in the 5 schools during the academic year because student researchers were scattered across the country. In preparation for administering the survey, NAM staff worked with each school to determine a date and time that would best fit their academic calendar. Four schools chose to utilize the electronic version of the survey; one chose the paper format. Surveys were completed during the school day in spring 2018. Schools emailed passive permission forms to parents and guardians of students in grades 9 through 12, a common practice in Minnesota high schools for gaining parental permission for youth to participate in similar surveys. Schools and students received incentives for participating. Schools were given a $500 stipend; participating students' names were entered into drawings for door prizes such as ear buds and portable chargers, university water bottles and hats, and $10 gift cards.

Each school administered the survey; NAM staff were on site to oversee the process, answer questions, and assist with any difficulties students may have had, such as clarifying the options for responses to the *gender* item. Student assent was obtained prior to them completing the survey. Students were informed that participation in the survey was voluntary and that they had the option to stop at any time, which some did.

Survey data were securely stored in Qualtrics™ until they were downloaded for statistical analysis. Downloaded data were stored on password-protected laptops. Upon completion of the project, and to fulfill the requirements of the Tribal IRB, de-identified data were returned to one Tribal community in compliance with their IRB approval. Paper versions of the survey were kept in a secure office by the principal investigator.

Phase 2 Data Analysis

Having access to data from the high school student surveys provided NAM student researchers with the opportunity to learn about the following:

- Creating a plan to analyze data, based on research questions
- Cleaning survey data and using a log to track steps in analysis
- Analyzing quantitative data from the survey using IBM SPSS Statistics software
- Determining which statistical test to employ to answer a research question
- Disseminating results of the study

For instance, students described the rate of tobacco use by students who were AIAN; the level of curiosity about using tobacco; and the relationship between income and tobacco use. They then disseminated information through posters presented at the conclusion of the second summer session.

RESULTS

Approximately 1,900 students in the 5 schools were eligible to complete the survey; 281 (15%) completed the survey, and 256 surveys were usable. Thirty-one percent (n = 80) self-identified as AIAN; 56% were male. Students' mean age was 15.8 years. Thirty-eight percent had previously tried cigarette smoking, even one or two puffs, and had previously vaped. Table 2 outlines the descriptive data of respondents' use of vapes, JUULs, Mods, or other e-cigarettes in their entire lives.

Table 3 further describes commercial tobacco use in terms of amount (if any), and Table 4 data are focused on participants' self-reported curiosity to try tobacco products. Students expressed more interest in trying vaping than any other method of using tobacco. The NAM students worked with program faculty to run additional analyses with the small sample size; they found that participants who had tried cigarette smoking, even one or two puffs, were more likely to also receive free or reduced lunch (χ^2 = 12.058[df = 1], p = .001). As shown in Table 4, a high percentage of students were not interested in commercial tobacco in any of its forms.

Additionally, participants were asked to report on traditional tobacco use, as described earlier, regarding both their own and their family's use of

traditional tobacco. Fifty-one percent used traditional tobacco; 9% had used it previously. Sixty-four percent reported that their family used traditional tobacco.

DISCUSSION

The aims of the NAM summer 2018-summer 2019 research experience were met: Student products (oral presentations, posters, and contributions to the manuscript define products) at the conclusion of the second summer indicated increased knowledge and capacity of AIAN undergraduate students to plan and conduct research. Student researchers were given opportunities to present at regional and national conferences and also presented at Tribal clinics. The study resulted in a survey with face validity to measure AIAN student tobacco use, curiosity about tobacco, and factors that influence both. Long-range outcomes, including the influence of the research experience on students' long-term career choices, will be assessed at a later date.

Data collected from this study are similar to other studies with AIAN youth. A national study that used the NYTS survey found that AIAN youth were more likely than youth from other racial and ethnic groups to smoke[19] and that most AIAN youth who used tobacco were using cigarettes rather than other methods of tobacco use.[20] Another study that used the U.S. Youth Risk Behavior Surveillance (YRBS) from 29 states found that although use of commercial tobacco and cigarette use was generally on the decline, AIAN youth were more likely than non-Native youth to either ever use or currently use cigarettes, cigars, and smokeless tobacco.[21] This disparity between AIAN youth and non-Native youth holds true for Aboriginal youth in Canada.[22,23]

CONCLUSION

This 2-year cohort approach to teaching qualitative and quantitative research skills to AIAN students was successful by internal benchmarks—namely, student researchers developed, implemented, and analyzed a survey appropriate for AIAN high school students, and all student researchers presented their scholarship at least once. In addition to learning research methodology, student investigators learned about team formation. This is particularly important given that some students were not able to attend the program for year 2 and new students joined the team. As a result, faculty had to adjust teaching methods to orient the new students while re-engaging the original cohort. While student retention and turnover may be a downside to a 2-year cohort program, the opportunity to build longitudinal relationships was seen as outweighing any negatives.

LIMITATIONS

One limitation to this research case study was the small sample size. As a result, student researchers did not have a large dataset from which to learn. Second, the survey instrument was modified from an existing survey. We attempted to keep many of the questions and answers similar to the CDC and MSS as much as possible to allow comparison of results. Item wording sometimes did not match the research question that student researchers wished to address. For instance, traditional tobacco use was not included in the original instrument. Third, because the summer program is only 6 weeks long, time for learning and conducting research is attenuated. Student researchers come from various universities across the nation, a recognized strength of the program, but this also means that students could not participate in work outside of those 6 weeks. As such, we had to balance a more in-depth research experience with what could be reasonably achieved during the program's time frame. Faculty continued the work outside of the summer experience with a commitment to maintaining the students' project progression. An external factor influencing recruitment of schools came from the administration of another school survey, the MSS, by the Minnesota Department of Education during the same time period. This competing survey limited the number of schools that could logistically participate in our project. Limitations during this study were similar to issues that arise in other studies, thereby providing student researchers the opportunity to experience real research challenges. This project demonstrates that regional medical campuses are situated to conduct this type of research that offers student learning opportunities. In particular, tying specific research projects directly to a regional campus's unique missions provides meaningful and relatable experiences for students, faculty, and community members. This project also demonstrated that it is possible to create a research instrument within a

short time frame and allow greater access to research opportunities for students. Additional testing to support the reliability and validity of our tool is recommended, as is expanding the diversity of the sample.

Table 1. Sample Coding Scheme for Data From Interviews

Source of content	Feedback regarding the wording of the item, why an item was important such as peer pressure, confusing wording of item, student misunderstanding, dilemma with the interview process, and student nonverbals.
Youth appraisal of the survey	
Observations about the youth by student researchers	
Notes	

Table 2. Use of Vapes, JUULs, Mods, or Other E-Cigarettes in Participants' Entire Lives

Days used vapes	Frequency	Percentage
0	54	67.5
1	9	11.3
2-10	6	7.5
11-20	5	6.3
21-50	3	3.8
51-100	2	2.5
More than 100	1	1.3

Table 3. Days Smoked

	Frequency	Percentage
1. I have never smoked cigarettes	50	62.5
2. 1 or more puffs but never a whole cigarette	8	10
3. 1 cigarette	6	7.5
4. 2 to 5 cigarettes	7	8.8
5. 6 to 15 cigarettes (about 1/2 a pack total)	2	2.5
6. 16 to 25 cigarettes (about 1 pack total)	0	0
7. 26 to 99 cigarettes (more than 1 pack, but less than 5 packs)	4	5
8. 100 or more cigarettes (5 or more packs)	2	2.5

Table 4. Curiosity to Try Various Forms of Tobacco

	Cigarettes		Vaping		Cigar		Chew	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Not at all	63	78.8	52	65	59	73.8	72	90
Unsure	9	11.3	12	15	12	15	4	5
Somewhat	5	6.3	10	12.5	5	6.3	3	3.8
Very	3	3.8	6	7.5	4	5	0	0.0

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