



Barbara V. Berney



ABSTRACTS

13th Annual Research Day

UNIVERSITY OF ILLINOIS
COLLEGE OF MEDICINE
AT ROCKFORD



thirteenth annual research day

Wednesday, March 26, 2008 11:30-5:30

SCHEDULE OF EVENTS

8:00AM - 1:30PM

11:00 - 11:45
11:30 - 1:00PM

1:00 - 1:45PM

1:45 - 2:00PM

2:00 - 3:00PM

3:00 - 4:00PM

4:00 - 4:15PM

4:15 - 5:00PM

6:30 - 7:30PM

Poster Judging

Database Training *(in Library)*
Lunch

**Poster Viewing, Department Displays,
Networking, Database Training** *(in Library)*

Welcome

Martin Lipsky, MD, Regional Dean

Introduction of Keynote Speaker

Robert Harner, MD, Cardiology and Internal Medicine

Keynote Presentation

"Alternate Treatment Options for the Management of Dyslipidemia"

Robert Rosenson, MD, University of Michigan

Sponsored by Abbott Laboratories

Student Presentations

Presentation of Poster Awards

Reception

Evening Program

"Women and Heart Disease"

Robert Harner, MD

General Information

ORGANIZERS - 2008

Research Day Committee

Tom Sutliff, PhD, Chair

Martin Lipsky, MD

Mitch King, MD

Ramaswamy Kalyanasundaram, PhD

Martin MacDowell, DrPh

Mianne Nelson

Janet Stull-Snow

Erin Werthman

The University of Illinois College of Medicine at Rockford's "Research Day" is held every year on the last Wednesday of March. Open to the public, the event is located in the lobby and auditorium of the College of Medicine at Rockford, 1601 Parkview Avenue, Rockford, Illinois.

The purposes of this activity are to provide our medical students, faculty and other health professionals with a forum to present their research and to provide a networking opportunity for health professionals from throughout the region. The event is also open to the faculty of the College of Medicine, the College of Nursing, the College of Pharmacy and the faculty and students of the Masters of Public Health Program. Other academic institutions in north central Illinois and south central Wisconsin, including Beloit College, Northern Illinois University, OSF College of Nursing, Rock Valley College and Rockford College are invited to participate, as are practicing healthcare professionals.

Posters are displayed from Wednesday until Friday. Authors are present to discuss their posters on Research Day. A variety of awards may be presented for excellence in posters on various topics. An invited speaker provides a keynote address on a topic of timely interest to health professionals.

RESEARCH POSTER AWARDS AND SPONSORS

Supporting Model Public Health Practices

Winnebago County Health Department, Board of Directors

Best Student Technical Poster

Winnebago County Medical Association

Best Literature Search Used in a Research Project

Crawford Library of the Health Sciences, College of Medicine at Rockford

Best Basic Research Poster

Thermo Fisher Scientific, Inc.

Excellence in Rural Health Disparities

National Center for Rural Health Professions, College of Medicine at Rockford

Best Original Research Paper Published in a Peer-Reviewed Journal in 2007

Office of the Regional Dean, College of Medicine at Rockford

Prostate Awareness: How Much Do Men Know About Prostate Cancer and Symptoms of BPH?

Purpose/hypothesis

The lifetime prevalence of prostate cancer is one in five men; the prevalence of benign prostatic hyperplasia (BPH) is estimated at 25% of men over the age of 40, and 50% over the age of 60. Five-year survival rates of prostate cancer are 100% when confined to the prostate, and 31.9% when metastasis has occurred. Complications of BPH include acute urinary retention, urinary incontinence, upper tract deterioration (renal failure), hematuria, urinary tract infections and bladder decompensation. Lack of patient knowledge may be a reason for delayed diagnosis and the mortality associated with prostate cancer and morbidity in BPH. Much research has been done regarding the prostate cancer knowledge base among African-American men. However, there are no studies regarding knowledge of prostate cancer or BPH in rural populations.

Research/study plan

The study entails collecting data in the form of a questionnaire from every man, 18 years or older, who visits the primary care office. Once the study is complete, we will be able to compare the results of men from urban and rural areas, differing educational backgrounds, different ages, those with a history of prostate disease compared to those without, and those who are self-reported as in good health, compared to those self-reported as being in poor health.

Methods

The Prostate Awareness Questionnaire contains six demographic questions in addition to 21 true/false questions about prostate cancer, cancer screening, BPH and lower urinary tract symptoms (LUTS).

Results

In process.

Conclusion

In process.

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Who Is Choosing to Use Birth Control and What Are They Choosing to Use? An Analysis of 2004 Behavioral Risk Factor Surveillance Survey Data

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Purpose/hypothesis

Despite the fact that contraception in a plethora of forms has become readily available to sexually active US adults wanting to prevent pregnancy, little current documentation exists regarding who is choosing to use birth control, nor methods chosen. This study sought to examine birth control choices by a number of socially relevant variables including: race/ethnicity, household income, gender, educational attainment and marital status. Health services variables (health insurance status, deferring medical care because of cost and having a personal healthcare provider) were also included in the analyses, as were individual attitudes (feelings about having children) and whether or not children younger than 18 were living in the household.

Research/study plan

To answer the research question, multivariate techniques were used to analyze the 2004 Behavioral Risk Factor Surveillance Survey (BRFSS) database.

Methods

BRFSS is a cross-sectional, random-digit telephone survey that is a collaborative project of the Centers for Disease Control and Prevention (CDC) and all US states and territories, targeting adults 18 through 99 years of age. Seven original BRFSS variables — age, education, annual household income, marital status, race/ethnicity, birth control method used and reasons for not using birth control — were re-coded for the analyses presented here. To provide more meaningful analyses, this approach required collapsing the multiple response categories into fewer categories.

Results

Multivariate regression analysis using “use of birth control” as the dependent variable yielded that the following were more likely to use birth control: Hispanic and Caucasian adults, persons younger than 35, those with health insurance, adults who have children younger than 18 living with them and adults who do not want to have children. Those less likely to report using birth control were: males, those without a college education, adults living in poorer households (less than \$35,000 annually), adults who have a primary care provider, those who have deferred medical care because of cost and those who are part of a couple.

Conclusion

The analyses presented here should prove useful to healthcare providers, as well as public health family planning programs.

Expectations Regarding Aging and Diabetes Self-Management in Rural Primary Care Patients

Purpose/hypothesis

The purpose of this study is to examine the association between expectations regarding aging and diabetes self-management in rural primary care patients in Illinois.

Research/study plan

Past studies indicate that perceptions of aging may impact coping responses to chronic illness. In particular, low expectations regarding aging have been associated with underutilization of preventive services for modifiable, age-associated conditions. However, little is known regarding how expectations regarding aging impact clinical outcomes in chronic illness, particularly for rural primary care patients with type 2 diabetes.

Methods

Participants aged 18 years and older with type 2 diabetes were recruited as part of a convenience sample from a rural primary care office in the Midwest. After informed consent was obtained, participants completed a series of self-report questionnaires to assess perceived barriers to effective diabetes care, demographic information and expectations regarding aging (via a self-administered survey, the ERA-12). Clinical data pertaining to diabetes was abstracted from medical records.

Results

Among this rural primary care sample, many beliefs regarding worsening physical and cognitive function were largely attributed to the expected process of aging. Participants who endorsed lower expectations regarding aging were more likely to have suboptimal diabetes clinical outcomes. Additional analyses identified relationships among expectations regarding aging and perceived barriers to diabetes self-management.

Conclusion

The present study provides implications for understanding beliefs about aging and how these expectations may influence diabetes self-management in rural primary care patients. In this respect, beliefs regarding aging may be an important, but modifiable risk factor for improving health outcomes in patients with chronic illness.

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Perceived Barriers of Diabetes Self-Management and Clinical Outcomes in Rural Primary Care Patients in Iroquois County

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Purpose/hypothesis

The purpose of this study is to examine the impact of perceived barriers on diabetes self-management among rural primary care patients in Iroquois County, Illinois.

Research/study plan

Rural health disparities often pose unique challenges to chronic illness management. Numerous perceived barriers to diabetes self-management have been reported by rural primary care patients in Illinois. Yet, little is known regarding how such barriers influence patient adherence to self-care regimens and ultimately diabetes clinical outcomes.

Methods

Participants aged 18 years and older with type 2 diabetes were recruited as part of a convenience sample from a rural primary care office. After informed consent was obtained, participants completed a series of self-report questionnaires to assess perceived barriers to effective diabetes care, knowledge of diabetes management and demographic information. Medical data pertaining to type 2 diabetes was also abstracted from medical records of each participant.

Results

Participants reported numerous perceived barriers to diabetes self-management, with poorer glycemic control associated with a greater number of perceived barriers. Further analyses identified relationships among specific barriers, diabetes clinical outcomes and patient knowledge of diabetes care.

Conclusion

These findings reiterate the need for increased awareness of patient barriers to diabetes self-management, and the influence of barriers on diabetes clinical outcomes among primary care patients in rural areas.

A Study of Mental Engagement on Self-Efficacy in the Elderly

Purpose/hypothesis

The overall purpose of this project was to provide a means of mental stimulation for senior citizens and to study its usefulness in improving their self-efficacy.

Research/study plan

This pilot study investigated senior citizens' self-efficacy, both before and after mental stimulation, from a computer game entitled "Acuity."

Methods

"Acuity" is a computer-generated program in multiple choice format, specifically designed to stimulate the mental acuity of elderly participants. There were a total of seven participants in the study. They were randomly assigned to one of two teams on each day of play. Each game consisted of two teams playing against each other. Each team was responsible for choosing two of the five categories of questions, while the computer chose the fifth category. The principal investigator served as a neutral facilitator, responsible for navigating the Web interface for each team, but not as a member of either team.

The game included 10 questions for each of the two teams, which were asked and answered in an alternating format between teams. Teams were able to choose the level of difficulty for each question. Each team was given 60 seconds to answer each of the 10 questions, and team members were allowed to confer amongst themselves before answering. Team scores were shown on the screen at all times, but were not used as an evaluation tool in the study. Evaluation was carried out by means of a pre and post self-efficacy survey, using the General Self-Efficacy Tool, written by Matthias Jerusalem and Ralf Schwarzer. Participants who attended multiple sessions completed the self-efficacy survey for each session.

Results

In process.

Conclusion

In process.

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Heart Failure Patient and Caregiver Guide: A Qualitative Analysis of an Interdisciplinary, Student-Created Resource for Disease Education and Management

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Purpose/hypothesis

A cohort of rural interdisciplinary students and I earlier developed a patient and caregiver guide for heart failure (HF) hospice patients, hoping to enhance patient education and decrease morbidity. This project is a continuation of the previous one, the goal of which is to evaluate the overall effectiveness and usefulness of a student-created self-education guide in the management of HF patients.

Research/study plan

The "Patient and Caregiver Guide for Heart Failure" was edited and updated to include current information, then distributed to patients diagnosed with HF presenting at the KSB Medical Group in Oregon, Illinois. The investigator administered the Minnesota Living with Heart Failure Questionnaire (MLHFQ) at the time the guide was distributed, and again at a one-month follow-up visit that also included an oral questionnaire.

Methods

At a scheduled medical visit, patients with heart failure, 18 years of age or older, were offered the opportunity to receive a "Patient and Caregiver Guide for Heart Failure" as part of the management of their disease. Written informed consent to participate in the study and authorization to use protected health information were obtained. The guide was distributed and the MLHFQ administered. Participants were asked to read the guide and use the accompanying materials, including logging daily health indicator charts, for a one-month period. At the end of the one-month trial, the investigator administered the second MLHFQ and an oral questionnaire via telephone, both of which were used to evaluate the usefulness and effectiveness of the HF guide.

Results

Seven of the nine HF patients who enrolled completed the study. Preliminary results from the MLHFQ suggest the HF guide did not significantly affect quality of life. The oral questionnaire revealed that six of seven participants would give the guide to a friend or family member. Five participants found the guide useful, while the other two neither read, nor used it. No participants knew the clinical classes of HF. Only two knew their ejection fraction, while none knew what ejection fraction actually measured. Two reported never having any previous education about HF; five had read pamphlets on HF. Further results will follow.

Conclusion

An interdisciplinary, student-created educational guide was welcomed, appreciated and found useful by heart failure patients, but did not improve their quality of life. Participants who used the guide would give it to a friend or family member because it contained helpful information, presented in a manner they could understand. Overall, participants had a poor knowledge of heart failure and none fully understood the meaning behind measuring ejection failure. All participants could benefit from further education about heart failure, but given the lack of use of the HF guide, education would probably be more effective when presented by an individual, such as a physician or nurse educator, instead of in a pamphlet or booklet.

Medical School Research Unit Assists Local Health Department and Local Partners to Integrate Two Planning Models for Community Health Improvement

Purpose/hypothesis

The purpose of the study was to demonstrate how major health problems in McHenry County were identified using two collaborative planning models.

Research/study plan

Two planning processes, “Healthy Communities” and “Mobilizing for Action through Planning and Partnerships” (MAPP) were used to engage community participation in a comprehensive health needs assessment of McHenry County. This poster will illustrate the strengths and limitations of each process, while showing their logical progression and key findings.

Methods

With guidance from Health Systems Research (HSR), the McHenry County (Illinois) Department of Health and local partners used two planning models consecutively, Healthy Communities and MAPP.

In assessing the community’s health, the Healthy Communities framework relied on focus groups, key informant interviews, a household survey and extensive secondary data analysis. This year-long study became the basis for MAPP’s community health status assessment, which was supplemented by two additional assessments, Local Public Health System and Forces of Change/Themes and Strengths.

Results

The Healthy Communities process yielded three major community problems in McHenry County: barriers to healthcare (cost, transportation, language), impact of growth and development, and limited access to high-paying jobs by the Hispanic population. Using MAPP, priority issues were: lack of access to care (medical, dental, mental health), cardiovascular disease, and information and referral.

Conclusion

Both health planning processes cultivated strong community involvement. Healthy Communities provided more flexibility, while MAPP, through additional assessments, drew in additional participation and set the stage for implementation.

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Nutrition and Exercise in a Rural Area Fourth Grade

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Purpose/hypothesis

This project was based on journal articles broaching the idea that adult obesity may be strongly influenced by habits developed in adolescence, indicating an important need for childhood intervention. The purpose was to evaluate rural adolescents' knowledge, and to pave the way for further studies that assess whether early education about exercise and nutrition impact adult lifestyles. This study and educational intervention were intended to determine the effectiveness of including a dual-purpose health itinerary in elementary-level curriculum, with a goal of decreasing future obesity levels in rural students.

Research/study plan

Chosen for the study were 120 fourth-grader students at Woodland Elementary School in Iroquois County (Illinois). At this age, the children have begun to advance abstract problem solving using logic, allowing them to put to use knowledge gained from the study. Subjects were informed of the study's purpose and requirements. Through a series of three lectures, an organized classroom game and pre- and post-intervention surveys, students were taught about proper nutrition and adequate exercise to maintain a healthy lifestyle. Student-T and ANOVA analyses were applied to the data.

Methods

A pre-intervention survey was administered to the children to assess their knowledge of nutrition and exercise. A lecture followed, explaining the proper evaluation of nutrition. Students were taught how to determine their own appropriate number of calories per day. The second lecture focused on providing information about the proper amount of exercise needed to maintain a healthy lifestyle, and how to adjust daily exercise to reflect caloric intake. Lecture three was an organized game in which the class was divided into several teams. Each team coached an imaginary person through one month of maintaining a healthy lifestyle. The study ended with a post-intervention survey to reevaluate students' understanding of nutrition and exercise.

Results

Preliminary results indicate that the school board and the parents are very open to the idea of teaching students about healthier living. I anticipate that the children will be quick learners and will integrate this information easily, and that their post-intervention survey scores will show an increased knowledge of nutrition and exercise in maintaining a healthy lifestyle.

Rural and Urban Patient Satisfaction With Office Visit Communication at Family Medicine Residency Program Clinics

Purpose/hypothesis

This study sought to identify physician behaviors that are important to rural and urban patients, and to assess whether rural and urban patient populations prefer different physician communication behaviors. The information revealed in the study could be adopted by health practitioners seeking to improve patient satisfaction.

Research/study plan

Doctors affiliated with both the Rockford and Dixon locations of the University of Illinois College of Medicine at Rockford Family Medicine Residency program agreed to participate in the study.

Methods

Consenting patients completed a survey in which they indicated, on a Likert scale, the importance of 13 communication-related attributes and their perceived ability to judge quality of care. Demographic data including gender, age, race, ethnicity and education level was also collected. Survey reading level was mid-seventh grade. Due to non-normal distributions, non-parametric tests were used to analyze the data. SPSS factor analysis was used to categorize the communication attributes. SPSS TwoStep cluster analysis was used to identify natural groups of patients.

Results

Two patient clusters were identified. Technical healthcare seekers (13.7% of patients) scored significantly below average on effective interaction and view healthcare as a transaction-related service. Interpersonal communicators (86.3% of patients) scored significantly above average on most effective interaction and view healthcare as a relationship.

Conclusion

This study confirmed the qualitative results of previous studies and extended them to rural and urban patients. Overall, there was a general similarity of preferences across patient populations, with variations by location, age, race, ethnicity and education level. The results reinforced the value of personalized office-visit communication in both rural and urban health care. The communication categories suggested areas for improvement of patient-doctor interaction.

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A Comparison of Motivational Values in Physicians and Practice Satisfaction in the US and India

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Purpose/hypothesis

The purpose of the survey was to conduct a comparative study on the motivational values and guiding principles in medical practice among physicians in the US and India. We also aimed to compare the degree of satisfaction with the practice of medicine.

Research/study plan

We designed and conducted a questionnaire, based on the Schwartz personal values scale, to assess the personal values and practice satisfaction of physicians working in India and the US. All participants were asked to complete the questionnaire on the personal values that guide their practice of medicine, and three questions on their degree of satisfaction with the practice of medicine. The survey then asked respondents to rate 50 human values that act as guiding principles in their lives.

Methods

The survey was distributed personally in India by a residency program director. In the US, it was handed out personally, mailed or administered via the Internet using surveymonkey.com.

Results

A preliminary analysis revealed significant statistical differences in the 10 motivational values of physicians in India and the US. There were significant differences in the values of achievement ($p < .002$), universalism ($p < .000$), security ($p < 0.000$) and benevolence ($p < .015$). No statistically significant difference was found for the values of tradition, power, achievement, hedonism, stimulation and self-direction. There was a significant difference in practice satisfaction ($p < .001$) between the two groups.

Conclusion

This study is relevant because the number of foreign-trained physicians working in the US has grown, and it will be informative to evaluate any differences in their work culture and the need for acculturation when they move to the US.

Assessing Health Issues and Health Behaviors Among Younger and Older Latino Immigrants in Rural Communities

Purpose/hypothesis

The purpose of this study is to assess current health conditions, practices, risk factors and health information preferences among rural Latino adults.

Research/study plan

Comparisons and contrasts between older (60+) and younger adults were made based on a community needs assessment survey, which is part of a larger, ongoing research effort among rural Latino populations in Illinois.

Methods

A cross-sectional needs assessment survey was conducted among rural Latino immigrants in six rural communities in Illinois (n=941) using a convenience sampling strategy. Descriptive and bivariate analyses were conducted using Chi-square and t-tests to look for differences among the age groups.

Results

Compared to their younger counterparts, older adult Latinos in rural areas had more difficulty in accessing medical and dental care services ($p < .01$), engaged less frequently in high-risk health behaviors ($p < .05$) and had different preferences for receiving health information ($p < .01$).

Conclusion

The findings suggest that increased attention to the specific healthcare needs, access issues and communication preferences should be factors to consider when promoting health among older Latino populations.

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Discussing the End – A Survey of One Rural Illinois Community on End-of-Life Issues, Durable Power of Attorney, and Communication of These Topics

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Purpose/hypothesis

The purpose of this project is to determine if, and to what extent, people in rural communities discuss end-of-life issues, such as durable power of attorney, hospice care and living wills. An assessment of this data can establish evidence of which issues have and have not been discussed, what barriers prevent these discussions and methods to better facilitate initiating such conversations. Some research has been done in urban populations on the discussion of end-of-life issues, but very little has been done in rural communities. The goal of this project is to introduce and spur on these very important conversations.

Research/study plan

The project will be undertaken by submitting surveys to small groups of adult cohorts to assess their understanding of what state laws mandate as default power of attorney, consequences of not discussing end-of-life issues, how to initiate end-of-life issue conversations, and how to include a primary care provider in the results of such conversations.

Methods

Participants will view a short video on discussing end-of-life issues, fill out a 12-question survey, and receive a 12-page legal document to take home, read and fill out with family and/or close ones. The entire time spent with participants should be approximately an hour.

Results

IRB approval pending.

Towards the Successful Use of Local Partnerships to Reduce Health Disparity: Lessons Learned From a Preliminary Evaluation of Rural Hispanic Health Advisory Committees

Purpose/hypothesis

The success of community-based participatory research approaches to reduce health disparities largely depends upon the successful formation and sustainability of community partnerships. However, little is known regarding the factors that contribute to, or lessen these partnerships' ability to work more effectively.

Research/study plan

Project EXPORT Center for Excellence in Rural Health at the University of Illinois College of Medicine at Rockford formed 10 local partnerships in rural communities of Illinois between 2003 and 2006, with the objective of investigating Hispanic health disparity issues. Using a Community-Based Participatory Action Research (CBPAR) approach, partnerships have been actively involved in community assessments of health needs, implementation of mini projects to address those needs, and evaluation of numerous components of the process.

Methods

Results from a structure-process-outcomes evaluation of eight EXPORT-formed local Hispanic Health Advisory Committees (HHACs) are presented using survey data that was collected from active HHAC members six months after they started the mini projects implementation.

Results

Evaluation results suggest that HHACs have a good representation of academic and public health sectors, but could benefit from increased participation of safety net providers and Hispanic community members. There were high levels of satisfaction among participants related to decision making, communication, technical assistance, and to a lesser extent, financial resources. Partnership members perceived positive impacts of their work with regard to awareness building and the development of culturally appropriate communication and health promotion strategies for Hispanic community residents.

Conclusion

Associations between specific structural/process indicators and successful outcomes are discussed highlighting ideal partnerships' characteristics to effectively address health disparities in rural areas of the Midwest.

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Towards the Development of Sustainable Indigenous Health Policy: Insights From a Community-Based Assessment of Priority Health Concerns in the Colombian Amazon

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Purpose/hypothesis

Indigenous groups in various areas of the world face major barriers to access high quality healthcare and health promotion services due to various geographic, financial and cultural factors. Increased participation of indigenous peoples in healthcare and public health planning and policy is critical to decrease health disparities. Major concerns for indigenous peoples living in tropical environments include basic sanitation, perinatal diseases and transmissible diseases such as malaria, respiratory and gastrointestinal infections. However, the provision of adequate healthcare and health promotion services to address these issues is often challenged, not only by indigenous peoples' characteristics, but also by the characteristics of extrinsic factors including health policy and providers' levels of cultural competency.

Research/study plan

This paper uses the "vulnerability model" to understand how the confluence of community and external factors places this population at higher risks than other underserved groups.

Methods

A case study of three rural, indigenous villages in the Colombian Amazon is used to illustrate the challenges and opportunities offered by the use of a Community-Based Participatory Action Research (CBPAR) approach to identify and address priority health issues in a culturally inclusive and competent manner.

Results

Results from a community assessment of perceived barriers to access healthcare, major health concerns, proposed health promotion strategies and use of traditional medicine are presented from both community and providers' perspectives.

Results from this study are contrasted with those from the CBPAR experience addressing rural Hispanic health issues in Illinois. Implications for international health policy affecting indigenous peoples and other underserved groups are discussed.

Bringing the Gap Between Rural Hispanics and Health Care Services: Individual and Community Impacts of a Community-Based Medical Interpreters Training Program

Purpose/hypothesis

Rural Hispanic immigrants in the US face numerous barriers to accessing good quality healthcare. These barriers include travel time and distance from place of residence to healthcare centers, underinsurance and language barriers that significantly limit communication in the patient-provider encounter.

Research/study plan

Using a Community-Based Participatory Action Research (CBPAR) approach, the Center for Excellence in Rural Health Project EXPORT at the University of Illinois College of Medicine at Rockford identified language as the most significant barrier to accessing healthcare among 941 Hispanics living in five rural counties. Local Hispanic Health Advisory Committees (HHACs) in these counties partnered with research staff to offer a medical interpreter training program to address the language barrier concern.

Methods

Twenty-four bilingual community members participated in a basic, 40-hour, nationally recognized healthcare interpreter training opportunity. A six-month follow-up evaluation of this training was conducted.

Results

Results indicate high levels of participant satisfaction with various aspects of the training and their successful placement in local community clinics and organizations. Improvements in participants' employment status and opportunities for professional development are also noted. From an organizational standpoint, this community-based training program has also been beneficial for local healthcare providers who report significant increases in the number of rural Hispanic patients being served, and improvements in their ability to provide culturally appropriate services to their patients.

Conclusion

The finding of a critical need for community capacity building (ie, medical interpreter training) resulted from the participatory approach emphasized in the CBPAR model used in this effort.

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A Peer-Led, Popular Education-Based Oral Health Promotion Curriculum Targeting Latino and Migrant Communities

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Purpose/hypothesis

The purpose of this study is to evaluate an innovative, interactive, culturally responsive, education-based oral health curriculum targeting community health in migrant Latino farmer populations in Illinois.

Research/study plan

Many public health initiatives have used people from the community to improve awareness and to convey information about prevalent diseases that affect selected communities. However, there is a lack of data on the best approach to training community health workers. To our knowledge, there is no data on how a novel training method, based on active participation, discussion, experiential and participatory techniques impacts the knowledge, satisfaction and help that health promoters give to their communities.

We developed an interactive and culturally responsive, education-based oral health curriculum, targeting migrant Latino farmer populations from Illinois, with the purpose of training community health workers to conduct oral health education, assessments and referrals for dental care. To evaluate this novel approach we developed pre- and post-training surveys.

Methods

To develop this training program, we met with health promoter groups from Aurora, Mendota, Woodstock and Momence, Illinois. We discussed their perceptions regarding the most important concerns that people from their communities had about dental health. With the information obtained, we determined the main oral health concerns from their communities as follows: 1) number and functions of the teeth; 2) dental cavities; 3) periodontal disease; 4) nutrition; 5) dental emergencies and 6) oral health prevention and promotion.

The cornerstone of this program is training health promoters through different "hands-on" activities based on the oral health concerns cited above. For each concern, we developed objectives, materials and activities, such as the following for periodontal disease:

Objectives: to understand the concept of periodontal disease and its causes; and to identify the types, signs and symptoms, and the problems it causes.

Materials: pictures, pen/pencils, artificial teeth, and red and white Play-Doh.

Activities: health promoter dramatizations, use of pictures and magazines, and modeling of red and white Play-Doh and artificial teeth to recreate the different stages of periodontal disease.

Similar training activities are aimed at different oral health concerns. Every health promoter receives a dental tool kit containing the program, materials and booklets with the information needed for their training.

To evaluate the training program, we are using anonymous, Spanish-language pre- and post-training surveys.

Results

We anticipate that this training program will increase the awareness among community health workers of dental health issues relevant to our migrant Latino farmer population.

Evaluation of a Campus-Community Partnership to Promote Wellness and Interest in Health Careers Among Older Rural Elementary School Children

Purpose/hypothesis

The purpose of this study is to evaluate the knowledge changes among older elementary children from their participation in a two-day wellness and health careers education program.

Research/study plan

In 2006 and 2007, five rural elementary schools in Northwest Illinois participated in a two-day event called "4-H Health Jam," which involved 166 fifth- and sixth-grade students. The event's main objectives were to promote healthy lifestyles and encourage future interest in health careers. A partnership involving county and state 4-H educators, local classroom teachers and a rural hospital conducted the event with support from a large agribusiness company grant.

The first day was held at a camp and involved participation in exercise, nutrition education activities and interactions with diverse health professions students about science topics or careers. The second day, students learned first hand from five departments in a rural hospital how healthcare is delivered. In all learning activities, the students were engaged in experiencing a topic directly. The eight-week follow-up at their local school encouraged the habit of daily physical activity. During fall 2006 and 2007, the knowledge and attitude impacts of the event were evaluated using pre- and post-program surveys.

Methods

Using a survey process approved by the Urbana and Rockford IRB committees, an identical survey was implemented before and after the educational event in fall 2006 and 2007. Paired t-tests were used to assess the statistical significance of changes in 25 questions (n=166 children). A unique, anonymous participant identification number was used to match pre- and post-program surveys.

Results

Identical multiple choice questions related to knowledge objectives and a question asking for a listing of all known health careers were asked before and after the event each year. Analysis of responses to the 25 questions using paired t-tests indicate that 13/18 (72%) of the common survey questions used in both 2006 and 2007 to assess pre- and post-event changes showed statistically significant change ($p < .05$) in knowledge of health concepts and health career options. Of the questions unique to a given year, 7/15 (47%) showed statistically significant change ($p < .05$) in before and after surveys. The pattern of increase in knowledge and attitudes involved questions related both to a better understanding of maintaining and improving health status, and more accurate understanding of the role and number of health professions careers.

Conclusion

The findings indicate that a special, two-day experiential education event can substantially improve the knowledge of wellness behaviors and health careers among older rural elementary children. The findings from the eight-week follow-up of exercise behavior evaluation will be presented in the future. Teachers, students, hospital staff and health professions students also report subjective benefits from interacting in this application-oriented, educational partnership project.

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Patients' Reasons for Seeking Dermatological Care and Perception of Their Access to Dermatological Care: Rural and Urban Variations

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Purpose/hypothesis

The purpose of this study is to describe respondents' reasons for seeking care for their dermatological problems and perceptions about their access to specialized dermatological care.

Research/study plan

Patients in participating clinics completed a pre-tested survey soliciting their perceptions about reasons for seeking, and their access to dermatological care. Data was collection in the waiting rooms of six dermatology clinics throughout the central Midwest between June and August 2007. Respondents were a convenience sample of 365 patients seeking care from participating clinics. All who were asked to respond agreed to participate (response rate of 100%).

Methods

Descriptive statistics were used to summarize respondents' demographics. The chi square statistic was used to assess demographic differences, comparing respondents who indicated rural residence (a town of less than 50,000) versus urban residence (a town of 50,000 or more). Since data values were not normally distributed, the nonparametric Mann-Whitney U test was used to compare ranking and time integer values between rural and urban residents.

Results

For most respondents, changes in skin appearance, or the presence of an abnormality compelled them to make an appointment to see either a dermatologist or their primary care physician. Urban respondents were more likely ($p < .05$) to seek treatment for odd or unusual skin appearances than respondents from rural areas. The majority noted that they typically go directly to a dermatologist for treatment of skin problems, and they perceive dermatologists as better trained than primary care providers to treat skin conditions. Overall wait time for a dermatologist appointment was three times that of a primary care physician, and the average travel time to see a dermatologist was significantly longer ($p < .05$) for those who reside in rural areas.

Conclusion

This study highlighted respondents' positive perceptions of dermatologists, but noted problems that occur with access to dermatological care in rural areas. The main reasons for seeking care for skin conditions were either changes in skin appearance or the presence of an abnormality. Additional research administering a similar survey to patients presenting with a chief complaint of a skin problem in primary care offices could investigate whether similar or different patterns are observed.

Isolation of the Active Anti-Cancer Fractions from *Morinda citrifolia* (Noni) Puree

Purpose/hypothesis

Botanicals play a dominant role in the evolution of anti-cancer drugs and about 74% of the anti-cancer drugs are of a natural origin. *Morinda citrifolia* Linn (noni) has been used for cancer treatment in Polynesian folk medicine. We hypothesized that the anti-cancer components might exist in noni fruits. Several lines of evidence support our hypothesis: noni juice made from noni fruits in Tahiti (TNJ) has proven to be anti-oxidative, anti-inflammatory, anti-carcinogenic and anti-angiogenic. A recent study indicated that TNJ prevents breast cancer at the initiation stage and directly kills cancer cells in vitro.

Research/study plan

To test our hypothesis, a bioassay-directed phytochemistry study has been initiated to isolate and identify the anti-cancer components from noni puree by solvent extractions and column chromatography. An MTT assay was chosen to test the anti-cancer activity of each fraction on four human cancer cell lines. The end point of this study will be to develop a cost-effective, active fraction-based, alternative botanical product for cancer prevention and/or treatment, as well as a possible new anti-cancer drug development from the active fractions of noni puree. This study will make a great contribution to the “war on cancer.”

Methods

Selection of starting material: Tahitian noni puree was chosen because of its superior nutritional attributes. TNJ was officially approved as a “novel food” by the European Commission in 2003 and a new food resource by the Ministry of Health, People’s Republic of China, in 2007. **Fractionations:** Solvent extraction, column chromatography combined with separation, purification and crystallization were carried out in our lab to obtain five distinct fractions. **Anti-cancer activity:** Screening of anti-cancer activity of these fractions was carried out on four human cancer cell lines by MTT assay at SRI International Lab. IC₅₀ of each fraction was determined. The active fractions will be further studied to obtain the major anti-cancer compounds. **Chemical structure identification:** Further purification will be carried out on selected active anti-cancer fractions and chemical structure will be identified by NMR, 2D-NMR, and GC-MS and chemical analysis.

Results

Five fractions, EtOAC, CHCl₃, H₂O, Acet, and n-BuOH, have been obtained from noni puree. Anti-cancer activity of each fraction has been tested on human MCF-7 breast cancer, PC-3 prostate cancer, HT-29 colon cancer, and A549 lung cancer cell lines. The IC₅₀ is listed in Table 1, below:

Fractions	Concentration (µg/ml)	Human cancer cell lines			
		MCF-7	PC-3	HT-29	A549
EtOAC	IC ₅₀	16	44	66	46
CHCl ₃	IC ₅₀	40	91	98	101

Conclusion

The EtOAC and CHCl₃ fractions have strong anti-cancer activities on MCF-7 cells and relatively weak activity on the other three cell lines. EtOAC is the most active fraction. Thus, it could be possible to obtain a new anti-cancer compound from these two fractions of noni puree.

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Breast Cancer Prevention With *Morinda citrifolia* (Noni)

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Purpose/hypothesis

Breast cancer is the most common cancer and the second leading cause of death in US women. Its etiology remains unknown and preventive means are unavailable. Epidemiological studies indicate that environmental carcinogen exposure has been involved in the etiology and a diet rich in fruits and vegetables is associated with a reduced risk. *Morinda citrifolia* (noni) has been used as a folk medicine by Polynesians for over 2,000 years. It has a broad range of health benefits, including anti-cancer properties. Our hypothesis is that juice made from Tahitian noni fruits (TNJ) possesses a preventive effect at the initiation stage of breast cancer development.

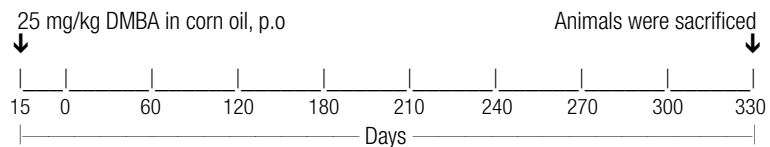
Research/study plan

To test our hypothesis, we examined the preventive effects of TNJ on a classical DMBA-induced mammary carcinogenesis model in female SD rats. This tumor model closely mimics human breast cancer and allows us to evaluate the preventive effect of a natural product at the initiation stage of chemical carcinogenesis. The animal experiment designed was based upon the defined stages of mammary carcinogenesis by Dr. Russo. TNJ and placebo were given for two weeks before DMBA administration and animals were sacrificed at 330 days post DMBA administration.

Methods

DMBA-induced mammary carcinogenesis model was chosen as our animal model in female SD rats.

Scheme 1: Cancer-preventive effect of TNJ on mammary gland tumor induced by DMBA I in female rats at the initiation stage.



One hundred and sixty female SD rats were divided into eight groups of 20 each. Three, five and 10% placebo, or three, five and 10% TNJ in drinking water were supplied two weeks before DMBA administration, and continuously supplied until 330 days after carcinogen exposure. Age-matched and positive controls were maintained on water.

We examined each animal weekly for tumors after DMBA administration in each group. We recorded, monitored and evaluated the cancer-preventive effect of TNJ on tumor incidence, latency of tumor appearance and multiplicity. We recorded body weight every other week.

Results

Tumor incidences in the noni groups were significantly reduced at different time points compared with the positive control and placebo groups (histopathological examination has not been completed yet). Tumor incidences in the placebo groups were slightly reduced. The appearance of the first tumors in the TNJ groups was delayed by 3 months compared with positive control and placebo groups. The cancer-preventive effect of TNJ was dose-dependent and was apparent 11 months post DMBA administration. Incidence of tumor was reduced by 73%, 72% or 80%, respectively, in animals that received 3%, 5%, or 10% TNJ in drinking water, compared with the positive control group. The tumor incidence was also significantly reduced by 62%, 62% and 78% respectively in animals that received 3%, 5% and 10% TNJ in drinking water compared with the corresponding doses of the placebo groups.

Conclusion

TNJ may prevent breast cancer at the initiation stage.

Parental Report of Substance Abuse Risk in the Children of Bureau and Surrounding Counties

Purpose/hypothesis

The Illinois Youth Survey of Bureau, LaSalle and Putnam Counties indicates that among sixth- through twelfth-graders, over the past month, the use of various substances including cigarettes, alcohol, marijuana and inhalants was much higher than the national average. The purpose of my project is to assess knowledge and attitudes of parents regarding substance abuse and their children, in addition to basic family dynamics. These measures are frequently used in assessments of substance abuse risk in children and will be used to identify factors that may be responsible for the higher-than-national average substance use in the specified region. The information will then be used to help direct future substance abuse prevention programs.

Research/study plan

Parents completed a survey, the results of which will be compared to factors used to assess individual substance abuse risk. The goal is to identify misconceptions and factors that increase substance abuse risk, and which could be addressed in future prevention programs.

Methods

A program entitled "Raising Healthy and Safe Teens" was advertised. Parents were recruited via fliers and newspaper ads throughout Bureau, LaSalle and Putnam Counties. At the beginning of the program, parents were asked to complete a survey, without identifiers, about family dynamics, as well as knowledge and attitudes regarding substance abuse. Each parent placed their survey in a sealed envelope that was then collected to ensure confidentiality. Afterwards, a presentation about parent-child relationships, substance abuse statistics and warning signs of substance abuse was made and informational packets were distributed to parents.

Results

I anticipate that the results will identify factors associated with an increased risk of substance use in children that may be addressed in future substance abuse prevention programs.

Conclusion

In process.

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Disparities in Adult African-American Women's Knowledge of Heart Attack and Stroke Symptoms: An Analysis of 2003-2005 Behavioral Risk Factor Surveillance Survey Data

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Purpose/hypothesis

Heart disease and stroke are the first and third leading cause of death of American women, respectively. African-American women experience a disproportionate burden of these diseases compared to Caucasian women, and are also more likely to delay seeking treatment for acute symptoms. Since knowledge is a first step in seeking care, this study examined the knowledge of heart attack and stroke symptoms among African-American women.

Research/study plan

This was a cross-sectional study analyzing 2003-2005 Behavioral Risk Factor Surveillance Survey data.

Methods

A composite heart attack and stroke knowledge score was computed for each respondent from the 13 heart attack and stroke symptom knowledge questions. Multivariate logistic regression was performed using low scores on the heart attack and stroke knowledge questions as the dependent variable.

Results

Twenty percent of the respondents were low scorers, while 23.8% were high scorers. Logistic regression analysis yielded that adult African-American women who earned low scores on the composite heart attack and stroke knowledge questions (range 0 to 8 points) were more likely to: be aged 18 to 34 (OR=1.36; CI 1.35, 1.37); be uninsured (OR=1.32; CI 1.31, 1.33); have an annual household income below \$35,000 (OR=1.46; CI 1.45, 1.47); and have a primary health care provider (OR=1.22; CI 1.20; 1.23).

Conclusion

The findings indicated that knowledge of heart attack and stroke symptoms varied significantly among African-American women, depending on socioeconomic variables. Targeting interventions to African-American women, particularly those in lower socioeconomic groups, may increase knowledge of heart attack and stroke symptoms, subsequently improving preventive action taken in response to these conditions.

What Physicians Think and What Other Providers Think Physicians Think: Physician Attitudes Toward and Knowledge and Use of Complementary and Alternative Medicine

Purpose/hypothesis

Conventional healthcare providers historically have received limited or no formal education in complementary and alternative medicine (CAM). Patients perceive them as biased against CAM. Consequently, many patients do not seek advice about use of CAM therapies from physicians, nurses and/or pharmacists, nor do they discuss their use with their healthcare providers. Providers miss opportunities to integrate beneficial CAM therapies into an overall plan of care, and conversely, patients may be compromising conventional medical treatment through the unexamined addition of CAM therapies.

Research/study plan

Results reported are derived from analysis of data collected as part of a larger, ongoing study to determine attitudes toward, and knowledge and use of, CAM among ambulatory care patients, primary and specialty care physicians, all levels of nurses, pharmacists and healthcare professions students. This larger study employs a multi-phase, multi-method design.

Methods

Phase 1 entailed conducting focus groups with primary care and specialist physicians (academic faculty, as well as hospital- and office-based), all levels of practicing nurses (advanced practice, nurse managers, RNs and LPNs), pharmacists (both in hospital practice and academic faculty), students (pharmacy, nurse practitioner and medical) and ambulatory care patients. The focus groups were designed to gather information on attitudes toward, and knowledge and use of, CAM that could be used in phase 2, which entails developing a survey to be administered widely in the regional academic and medical community.

Results

Focus groups with a total of 181 participants represented all of the populations of interest. Analysis of focus group data, with phase 2 as the goal, revealed a disjointed pattern of perceptions expressed by all non-physician participant groups about physician attitudes regarding CAM versus those actually expressed by physicians. Non-physicians articulated the view that physicians were either not interested in, or were simply not on board with CAM. For some, this was because physicians were "...just glued to conventional medicine." For others, it was grounded in an economic motive, "If they can make more money off of other things, they're not going to encourage CAM." Still others felt that physicians were skeptical of CAM, claiming, "some physicians think patients are 'pretending' if they get better..."

Data collected from physician focus groups, however, suggested that participants were more open to CAM than was perceived by all levels of nurses, pharmacists and healthcare students (medicine, pharmacy and nursing). Not only did many physicians consider specific CAM approaches, such as diet, exercise, biofeedback, chiropractics and behavioral medicine, to be legitimate medical practices, but they also perceived other CAM approaches, such as acupuncture for pain management and the use of some nutraceuticals, as beneficial. Furthermore, many believed patients felt empowered by choosing CAM therapies and that as physicians they could learn from CAM providers about how to deal more effectively with their patients as whole persons.

Physicians also indicated that they saw benefit in additional CAM training.

Conclusion

Physicians were more open to the training in and use of CAM therapies than other healthcare professionals, both in practice or in training, believed them to be.

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Characteristics That Identify Hispanic Women Likely to Be Ill-Informed About Heart Attack and Stroke Symptoms: An Analysis of 2003-2005 Behavioral Risk Factor Surveillance Survey Data

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Purpose/hypothesis

The research question for this study was: Are there within-group disparities in Hispanic women's knowledge of heart attack and stroke symptoms?

Research/study plan

Hispanics constitute the fastest growing group in the US, and have surpassed other racial and ethnic groups to become the largest US minority. They make up about one third of the US population, and hence are a group of significant interest for healthcare providers. Few studies have examined heart attack and stroke symptom awareness among adult Hispanic women, a group at high risk for delays in treatment. Research is needed to elucidate their knowledge of warning symptoms for these vascular events.

Methods

Behavioral Risk Factor Surveillance Survey data from states using the 2003-2005 Heart and Stroke modules were examined by multivariate techniques. To maximize representation of the sample, three years of survey data (2003-2005) were amalgamated into a single data set. If a given state administered the Heart and Stroke module in multiple years, only data from the most recent year were included in the merged data set. In the final analysis, data from 23 states, one territory and the District of Columbia were included in the combined 2003-2005 database.

Results

Adult Hispanic women earning low scores on the heart attack and stroke knowledge questions were more likely to: have less than a high school education, be uninsured, live in a household with an annual income less than \$35,000 and not have a primary care provider.

Conclusion

These results suggest that strategies to educate Hispanic women on signs and symptoms of heart attack and stroke might benefit from targeting groups with low knowledge scores.

Incorporating Research Into a Longitudinal Family Medicine Clerkship: Reflections on an M3 Practice-Based Research Network

Purpose/hypothesis

As the research enterprise in family medicine has matured, studies conducted in practice settings have become an important component of the effort to construct the scientific knowledge base of the discipline. Practice-Based Research Networks (PBRNs) have proven to be feasible and productive contributors to clinical primary care research. Most PBRNs share the following four goals: 1) to bridge the gap between research and practice by conducting research in practices and promoting evidence obtained in practice settings; 2) to develop clinically relevant research questions; 3) to promote best practices by disseminating scientifically based evidence in the form of clinical practice guidelines and 4) to identify and overcome barriers to implementing guidelines in physicians' practices. This poster describes the M3 PBRN at the College of Medicine at Rockford, as well as the evaluation conducted after its first year of operation.

Research/study plan

A formal evaluation was conducted of this M3 family and community medicine curricular activity.

Methods

In April 2007, after completing their PBRN work for the family and community medicine Clerkship, all M3 students were asked to evaluate their experience. IRB approval was obtained for this process. A five-question survey employing a five-point, Likert-type scale was administered by the student research leaders to the entire M3 class. Survey items focused evaluation attention on exposure to conducting research, the PBRN module as a learning experience, both the orientation session and the data analysis session (phase 2) and clinic support in completing the data collection requirements.

Results

Thirty-nine of the 43 participating M3 students completed the evaluation for a 90% response rate. The results of the evaluation are presented in two ways, aggregated by the entire class and aggregated by clinic site. When comparing the whole class aggregated results with the individual clinic aggregated results, it is clear that students from clinic one were slightly more critical of the enterprise than students completing their clerkship in either of the other two clinics. In general, students agreed that the M3 PBRN module exposed them to a clinical research process, that the orientation session outlined all of the work they were expected to complete and that their clinic was supportive in their data collection obligations. The students were neutral about the experience being valuable.

Conclusion

The M3 student PBRN has proven to be an effective teaching tool for clinical research. Further, the PBRN promoted the fact that family medicine providers can engage in meaningful research. Moreover, this endeavor provided an objective measure to grade students' research capabilities. **Finally, a study on smoking cessation and the use of spirometry is planned for the next academic year. (Nice, but not relevant.)**

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Disparities in Stroke Symptom Knowledge Among US Mid-Life Women: An Analysis of 2003-2005 Behavioral Risk Factor Surveillance Survey Data

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Purpose/hypothesis

A higher prevalence of stroke appears to exist among women aged 45 to 54 years, compared to same-aged men. Additionally, compared to their male counterparts, women experience a three-fold risk of delay in hospital arrival time. Inadequate knowledge of stroke symptoms may account for this disparity in hospital arrival time. We assessed current knowledge of stroke symptoms among mid-life US women and examined the relationship between symptom knowledge and race, income, education, deferring medical care, having a primary care provider and health insurance status.

Research/study plan

This was a cross-sectional study.

Methods

This was a cross-sectional study analyzing 2003-2005 Behavioral Risk Factor Surveillance Survey data. From the seven stroke symptom knowledge questions asked on the survey a "stroke knowledge score" was computed for each respondent. Multivariate data analysis techniques were used.

Results

Multivariate analysis revealed that US women aged 45 to 54 years with low stroke knowledge scores were: more likely to be Hispanic (OR=4.44; CI=4.37-4.51) or African-American (OR=2.55; CI=2.52-2.58), have less than a high school education (OR=2.67; CI=2.63-2.71), have an annual household income less than \$35,000 (OR=2.00; CI=1.98-2.02), have a primary care provider (OR=1.78; CI = 1.75-1.81), have deferred medical care because of cost (OR=1.35; CI=1.33,1.36) and are less likely to have health insurance (OR=0.70; CI=0.67- 0.71).

Conclusion

Disparities in stroke symptom knowledge exist along racial/ethnic and socioeconomic lines. Nevertheless, mid-life women have high levels of knowledge about the symptoms of stroke, hence strategies aimed at encouraging women to act promptly when experiencing symptoms could yield more benefit in reducing delays in stroke treatment than educational programs.

Treatment with Telomere 3' Overhang Sequences Induces Cell Cycle Arrest, Apoptosis, and Differentiation in Colon Cancer Cells

Purpose/hypothesis

Telomeres are tandem repeats of the DNA sequence TTAGGG. The 3' end of each telomere consists of a single-stranded G-rich overhang that has been proposed to stabilize a loop structure at the chromosome ends. Selective destabilization of telomeres may have therapeutic potential in the treatment of cancer. Hence we were interested in studying the therapeutic effects of T-oligo on colon cancer cells and its mechanism of action.

Research/study plan

Apoptosis and S-phase arrest were studied in two colon cancer cell lines, HT-29 and LoVo cells, which have mutant and wild type p53 respectively. The effect of T-oligo was also studied on differentiation of HT-29 cells, which differentiate in culture conditions. The effect of T-oligo was also investigated on senescence in LoVo cells. The mechanism of induction of apoptosis and differentiation was further investigated in these two colon cancer cell lines.

Methods

Apoptosis and S-phase arrest were studied by FACS analysis using propidium iodide. Induction of p53 and various other signaling molecules was studied by western blotting. Differentiation was studied by western blotting and PAS staining. Senescence was studied by X-gal staining.

Results

We treated colon cancer cells HT-29 and LoVo with an 11-base oligo nucleotide that is homologous to the telomere overhang (5'GTTAGGGTTAG-3', referred to as T-oligo). Treatment with T-oligo induced S-phase arrest and inhibited proliferation by 50% by 24 hours, whereas treatment with an 11-base oligonucleotide that is the reverse complement of T-oligo (5'-CTAACCCTAAC-3') did not. Consistent with the S-phase arrest, E2F1 levels were increased. LoVo cells contain wild-type p53, whereas HT-29 cells contain mutant p53; we conclude that T-oligo does not cause G1 arrest, nor is S-phase arrest dependent on wild-type p53. In HT-29 cells, T-oligo induced a two- to three-fold increase in apoptosis in comparison to diluent or reverse complement by 72 hours after treatment. In addition, treatment with T-oligo induced DNA damage-response markers at 24 hours, including increased phosphorylation of histone H2AX, increased levels of p53, and increased phosphorylation of p53 at serine 15. T-oligo also induced markers for differentiation in HT-29 cells by 72 hours, including increased mucin production (six-fold) as evidenced by increased staining with periodic acid Schiff (PAS), and up-regulation of villin by Western blot analysis. In LoVo cells, T-oligo induced morphological changes consistent with induction of senescence and a 10-fold increase in the number of x-gal positive cells which is a marker of senescence.

Conclusion

These results show that telomere overhang sequences can induce S-phase arrest, inhibit growth, and induce apoptosis, differentiation and senescence markers in colon cancer cells. Future experiments to explore the mechanism of action of T-oligo could spur the development of telomere-specific drugs that have novel therapeutic potential.

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Telomere 3' Overhang Specific DNA Induces Apoptosis and Differentiation in Melanoma Through p53.

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Purpose/hypothesis

Telomeres are tandem repeats of the DNA sequence TTAGGG. The 3' end of each telomere consists of a single-stranded overhang that is normally concealed in a loop structure at the chromosome ends. We postulate that exposure of this sequence upon telomere disruption induces responses such as apoptosis and differentiation. We were further interested in studying the mechanism of induction of differentiation and apoptosis in melanoma cells.

Research/study plan

Apoptosis was studied in five melanoma cell lines. The mechanism of induction of apoptosis was further investigated in three most responsive melanoma cell lines. Differentiation was studied in Mu melanoma cells, which have a differentiated phenotype.

Methods

Apoptosis was studied by FACS analysis using propidium iodide. Induction of p53 and various other signaling molecules was studied by western blotting. siRNA treatment was done by transfection with oligofectamine. Downregulation of p53, TRP-1 and tyrosinase were analyzed by western blotting. Activation of caspases was studied by western blotting and colorimetric enzyme assay.

Results

We have shown that treatment of five human melanoma cell lines with an 11-base oligonucleotide homologous to the telomere 3' overhang sequence (T-oligo) induces cell cycle arrest and apoptosis (29-64%) in four out of five melanoma cell lines. We have further investigated three most responsive cell lines and found induction of the E2F1 transcription factor and p53, known to cooperate with E2F1 in apoptosis. In Mu melanoma we found induction of p53, phosphorylated p53 at ser-15 and p21 at 24 to 48 hours. Apoptosis induced by T-oligo is inhibited by 45% upon inhibition of expression of p53 by using an siRNA against p53, indicating that p53 has a substantial, but not exclusive, role in T-oligo mediated apoptosis. By western blotting in Mu melanoma cells, the differentiation markers tyrosinase and TRP-1 are upregulated 96 hours after T-oligo treatment. Treatment with p53 siRNA inhibited this T-oligo mediated increase in differentiation proteins, indicating that T-oligo mediated increase in differentiation is mediated through p53. Additionally, in Mu and PM-WK melanoma cells, T-oligo treatment resulted in activation of caspase 9, which is an initiator caspase and caspase 3 and 7, which are downstream effector caspases as seen by immunoblotting. A four-fold increase in caspase 3 enzyme activity was observed colorimetrically in Mu melanoma at 72-96 hours. We also found downregulation of survivin an inhibitor of apoptosis protein at 72 hours after T-oligo treatment.

Conclusion

These data demonstrate the therapeutic potential of T-oligo and indicate that p53 plays a major role in T-oligo mediated apoptosis and differentiation in melanoma cells.

Longitudinal Analysis of Metabolic Inhibitors on Nociception in Male DBA-1 Mice

Purpose/hypothesis

Previous results from this laboratory have demonstrated the hypoalgesic effects of restricted caloric intake (CR) on acute, tonic and chronic pain. The observation that a simple 40% reduction in dietary intake will ameliorate the chronic pain associated with the mouse model of rheumatoid arthritis has spurred an investigation into the effects of compounds that will potentially mimic the effects of CR.

Research/study plan

Cohorts of male DBA-1 mice were exposed to varying levels of 2-deoxy-D-glucose (2-DG), mercaptoacetate (MC), and malonic acid (MA) with ad libitum water and chow for a period of nearly 55 weeks (n=5). During that time, response times to noxious thermal stimuli (hot plate at 52 °C) were gathered once or twice weekly. We have also measured the effects of 2-DG, MC and MA on the nociception of male DBA-1 mice exposed to noxious chemical stimuli. Body function information, including body weight, core body temperature, food, respiration rates and mimetic consumption, was also gathered and compared to controls.

Methods

Periodic body temperature measurements were recorded using small implantable transponders (IPTT-300, Bio Medic Data Systems, Seaford, DE, Cat #IPTT-300). In addition, information on activity and core body temperature rhythms was gathered using G2-E Vital View implantable probes (Mini Mitter, Bend, OR, Cat # 870-0010-00) and a dedicated sensor system. The response to noxious chemical stimuli was evaluated using 10 µl of 5% formalin injected subcutaneously into the hind paw pad of the mouse. Licking or biting of the injected paw was recorded at five-minute intervals for 60 minutes. Insulin levels of treated mice were obtained using the Linco (Linco Research, Inc., St. Charles, MO) mouse insulin ELISA kit (Cat # EZRMI-13K) and the Elx800 microplate reader from Biotek (Winooski, VT, Cat # Elx800). Blood glucose levels were determined using a ReliOn Ultima blood glucose monitor (Solartek Products, Inc., Alameda, CA).

Results

We have been able to generate a dose-response curve for the metabolic oxidation inhibitors 2-DG and MA, which show peak analgesia at very low concentrations. The analgesia as determined from the hot plate test has been followed longitudinally for over half of the mouse lifespan and is shown to be reversible when the mimetics were withdrawn, but a notable decrease in body weight persisted. The latency times on the hot plate also appear to be age dependent. The response of the mice on 2-DG, MC and MA to tonic pain from noxious chemical stimuli (formalin) is graded with an effectiveness of 2-DG > MA > MC.

Conclusion

The biomarkers characteristic of CR (eg, lowered core temperature, glucose and insulin) are not exactly mimicked by the inhibitors in this study. However, the lowered blood insulin resulting from the administration of MA, which is known to inhibit mitochondrial respiration in complex II, may implicate the involvement of energy balance in the mechanism of analgesia.

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Promoting Healthier Living in Lee County Illinois: A Health Fair Approach

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Purpose/hypothesis

Farmers are a unique population with an increased risk for common chronic health conditions. These risks result from the physical demands of the occupation, as well as from economic barriers and limited access to healthcare services. Although these risks are well known, farmers infrequently utilize preventive healthcare services to detect chronic disease early in its course, or better, to prevent chronic diseases from developing. It has also been thought that this lack of utilization is related to the health beliefs of farmers. The purpose of this study was to gather baseline data pertaining to the health beliefs and health status of farmers in Lee County, Illinois.

Research/study plan

Rosenstock's (1974) Health Belief Model served as the organizing framework for this study.

Methods

Data collection took place at a local health fair designed specifically for farmers, their spouses and/or hired employees over the age of 18, who live and/or farm in Lee County, Illinois (n=73). Each subject was screened for hypertension, diabetes, heart disease, obesity and occupational lung disease. Each participant also completed several health questionnaires, including a survey that queried the health beliefs of the population.

Results

The prevalence of diabetes, obesity and occupational lung disease was greater among participants younger than 65 of age. Conditions more prevalent among the Lee County population, as compared to the US population, included obesity, hypertension and hyperlipidemia. Participants reported on the health belief survey that they had not previously sought preventive health services because of cost/insurance, work schedules/time, lack of knowledge of where services were offered and lack of awareness of the need for health screenings. Reasons farmers provided for attending the health fair included convenience, cost-effectiveness and to get a check-up. All but one participant indicated that they were happy with the health fair and would attend one again.

Conclusion

Rural health fairs are an effective means to remove barriers to preventive health services for farmers and their families. In this setting, they are able to obtain preventive screenings in a cost-effective, convenient and non-threatening manner. In turn, data pertaining to the health status and beliefs of the participants can be gathered and compared to the general population, revealing any disparities that may exist.

Description of the Use and Self-Reported Efficacy of Smoking Cessation Techniques in Rural Illinois

Purpose/hypothesis

Smoking rates and smoking cessation attempts and methods will not vary between a primarily rural study population and previously published data.

Research/study plan

Cigarette smoking is the leading cause of preventable, premature death in the United states. It contributes to the public health burden of heart disease, peripheral vascular disease, stroke, lung diseases and several types of cancers. Sixty-eight percent of smokers report being interested in quitting, but only about 20% are planning to quit at any given time. Much research has been done on smoking cessation and the efficacy of different methods. However, no research was found that focused on a rural population. This research will examine whether or not a primarily rural population will have rates of tobacco use similar to those of previous study populations. It will also address smoking cessation attempts and methods, and compare findings to already published data. It is thought that rural lifestyle and occupation will not lead to statistically different tobacco use rates and cessation attempts, and that the efficacy of methods will be the same as the general populations previously studied. This research will help healthcare providers serving rural populations to understand tobacco use in their patients better and to treat them more effectively.

Methods

Patients will be recruited by a verbal invitation from the primary investigator in the waiting area of the clinic when they come for a routine, outpatient office visit. Patients who agree to participate in the research will be given a consent form to read and sign. Should participants need assistance in completing the consent form due to vision or literacy issues, the PI will individually assist them and obtain a signature in private. All patients will be assured that they will be seen for their outpatient visit regardless of participation in the study.

Participants will be asked to complete the survey while waiting to be seen by their primary care physician. Surveys will be collected in a locked box located at the receptionist's desk. Data will be tabulated and compared to previously published data on smoking cessation.

Results

The study will be conducted from 2/1/2008 to 3/1/2008. No results are available at this time.

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Defining the Role of a Novel Small Heat Shock Protein (sHSP) in Host Immune Modulation by Lymphatic Filarial Parasites

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Purpose/hypothesis

This research deals with the disease lymphatic filariasis, the cause of which is believed to be a molecule secreted by parasites that mimic host regulatory functions. In this project, protocols were designed to study this molecule, along with the genes from which it is expressed. With this information, future experiments may be performed to study the specific mechanism by which this molecule acts to suppress immune functions.

Research/study plan

A mosquito-borne disease caused by the parasites *Wuchereria bancrofti* and *Brugia malayi*, lymphatic filariasis infects more than 120 million people in the tropics. These filarial parasites infect humans and live in the lymphatics by successfully evading host immune responses. Among the many hypotheses that have been postulated for the parasite's successful establishment and longevity in the mammalian host, the most important is the production of parasite-encoded products that mimic host regulatory factors.

Immune down-regulation is the hallmark of chronic lymphatic filarial infection, reflected in severely impaired, antigen-specific proliferative responses and decreased interferon- γ production. This impaired proliferative characteristic is regulated, in part, by interleukin-10 (IL-10). It is believed that a structurally unrelated IL-10-like molecule could be encoded by the brugian parasites that could bind to the IL-10 receptor and function like IL-10.

Methods

Cloning of BmHSP12.6: Using specific primers, the BmHSP12.6 was identified and characterized. Following characterization, a prokaryotic expression vector was transformed with the gene. The gene was expressed and the protein characterized. The gene was amplified using PCR and then sequenced. **Expression of BmHsp12.6 in BL21 DE3 plys S *E. coli* host:** After verifying the DNA sequences, the constructs were then transformed into bacterial host BL21 (DE3) for over expression using 1mM IPTG. **Stage-specific expression of BmHSP12.6:** The transcription of the BmHSP12.6 gene was studied at different life cycle stages of the parasite. This was normalized to the housekeeping gene, BmGAPDH, found in *Brugia malayi*. **ELISA to determine rBmHSP12.6 binding to hUL10R:** The binding of rBmHSP12.6 to hUL10R was tested at various concentrations starting from 0.5 $\mu\text{g/ml}$ to 10 $\mu\text{g/ml}$. **Competitive binding assay:** The ability of BmHSP12.6 to compete with hUL10 for binding to hUL10R was determined by a competitive ELISA.

Results

- 1) Characterization of the BmHSP12.6 protein showed that it belongs to a class of heat shock proteins secreted by other *C. elegans*.
- 2) The gene was found to be most expressed during the L4, adult and mf infective stages of the parasite.
- 3) The ELISA showed the rBmHSP12.6 binds in a dose-dependent fashion to hUL10R.
- 4) The ELISA showed the rBmHSP12.6 binds competitively with hUL10 to hUL10R.

Conclusion

- 1) A human IL-10 binding protein was identified from *B. malayi* using phage display screening.
- 2) PCR analyses showed that BmHSP12.6 is differentially transcribed, with the highest level of expression being present in the vertebrate stages of the parasite (L4, adult and mf) compared to its vector stage (L3).
- 3) Characterization studies showed that purified rBmHSP12.6 binds to hUL10R in a dose-dependent manner and interferes with hUL10 binding.

Immunosuppressant as Adjuvant for Tolerogenic Immunization

Purpose/hypothesis

The purpose of this research is to test the hypothesis that using an immunosuppressant as a tolerogenic adjuvant during the course of active immunization with antigen may induce tolerogenic dendritic cells (DCs), and antigen-specific CD4⁺CD25⁺ regulatory T cells (Treg) directly in vivo, thereby forcing active immunization toward tolerance.

Research/study plan

In mice with pre-established, delayed-type hypersensitivity (DTH) to hen ovalbumin (OVA), we determined whether synthetic glucocorticoid dexamethasone (DEX, an FDA-approved pharmaceutical immunosuppressant), when applied as a tolerogenic adjuvant during immunization with an OVA-derived antigen (suppressed immunization), can cause in animals induction of tolerogenic DCs and OVA-specific Treg, as well as long-term desensitization to OVA antigen.

Methods

BALB/c mice were sensitized for OVA by injecting (s.c.) mice with hen OVA (100 µg). The mice were also similarly sensitized for hen lysozyme (as a control antigen). Mice were then assessed for DTH to either sensitizing antigen. Next, mice that showed DTH to OVA were treated with suppressed immunization using an OVA-derived, MHC II-restricted peptide (OVA323-339) as immunogen and DEX as tolerogenic adjuvant. Two weeks after the immunization, all groups were assessed with three functional readouts: 1) DTH response using OVA as recall antigen; 2) expansion of OVA-specific Treg and 3) induction of tolerogenic DCs (assessed by their production of suppressive cytokine IL-10).

Results

Our results indicate that in comparison with control mice (treated with PBS, DEX alone, or OVA323-339 alone), mice treated with both DEX and OVA323-339 show desensitization to OVA antigen, which is associated with the induction of tolerogenic, IL-10-producing DCs and OVA323-339-specific Treg directly in vivo.

Conclusion

1) DEX can function as tolerogenic adjuvant and 2) suppressed immunization can lead to antigen-specific tolerance, which is associated with induction of tolerogenic DCs and antigen-specific Treg in vivo.

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The Effects of Caloric Restriction Mimetics on Pain Biomarkers in Male Mice

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Purpose/hypothesis

Caloric restriction has been shown to have various physiological benefits in male mice, and to provide an analgesic effect, as demonstrated by their response to acute, tonic and chronic pain conditions. However, due to the difficulty of maintaining such a diet for long-term periods, scientists have proposed the use of caloric restriction mimetics (physiological agents) as a means to elicit the same benefits. In this study, the use of caloric restriction mimetics was employed to determine whether these compounds can be used as an alternative to caloric restriction.

Research/study plan

The mimetics used in this study included 2-deoxyglucose (glycolysis inhibitor), mercaptoacetate (fatty acid oxidation inhibitor) and malonic acid. The effects of CR mimetics were observed through analgesia to thermal stimuli, formalin testing, cytokines such as glucose and insulin levels. Results were correlated with the maintenance and repair state characteristic of caloric restriction.

Methods

Hot plate testing: To measure the sensitivity to acute pain, mice were placed on a moderately hot plate ($52\text{ }^{\circ}\text{C} \pm 0.2\text{ }^{\circ}\text{C}$). The time was recorded until the mice licked the hind paw. If a mouse did not lick the paw for a period of 60 seconds, it was taken off the plate. **Formalin testing:** To measure the sensitivity to persistent pain, mice were placed in a restrainer while injected with 10 μl of 5% formalin solution. They were then placed in clear observation chambers. Time spent licking the injected feet was recorded in five-minute intervals up to one hour. **Glucose:** Glucose measurements were obtained by inserting a lancet into the leg veins of the mice while under light anesthesia. **Insulin:** Blood samples were taken from the tail veins of the mice while under light anesthesia (3% halothane with oxygen at a flow rate of 4 L/min). The blood collected was then centrifuged (Eppendorf tube rotor) to separate the serum. The serum was analyzed using a Linco mouse insulin ELISA kit.

Results

Hot plate test: 1) The 2-deoxy-D-glucose-treated cohort appeared to be more analgesic compared to the corresponding control. 2) The mercaptoacetate-treated cohort tended to be more analgesic compared to the corresponding control. However, this analgesic effect was not as significant compared to the 2-deoxy-D-glucose cohort. 3) The malonic acid-treated cohort appeared to be more analgesic than the corresponding control.

Formalin test: 1) The 2-deoxy-D-glucose cohort was clearly less sensitive to the formalin than the control. 2) The mercaptoacetate cohort may not be significantly different than the control, but the maximum was shifted to longer times. 3) The malonic acid cohort may not be significantly different than the control, but the maximum was shifted to longer times.

Glucose levels: Glucose levels were relatively lower in all groups in comparison with the control. However, the levels tended to rise with increasing concentration of the mimetics.

Insulin levels: No significant differences were noted for the groups receiving 2-deoxy-D-glucose and malonic acid, but the levels tended to be higher in the mercaptoacetate cohort.

Conclusion

- 1) This study suggests that the mimetics do provide analgesic effects in responses to noxious thermal and chemical stimuli.
- 2) Blood glucose levels seem to be affected by the dosage of the mimetic administered.
- 3) Neither biomarker (insulin levels) provided clear-cut results and will need further research.

Molecular Cloning, Expression, Purification and Evaluation of *B. malayi* GST as a Vaccine Candidate

Purpose/hypothesis

Lymphatic parasites survive for years in a complex immune environment by adopting various strategies of immune modulation, which include counteracting the oxidative free radical damage caused by the host. We now know that the filarial parasites secrete antioxidant enzymes. Among these, the glutathione-S-transferases (GSTs) have the potent ability to effectively neutralize any known cytotoxic products arising from reactive oxygen species (ROS) that attack cell membranes. Thus, GSTs have the potential to protect the parasite against the host immune response. Similar GSTs are produced by several helminthes including schistosomes, fasciola and the filarial parasite, *Seteria cervi*. The schistosome 28 GST has been successfully developed into a vaccine and is currently in phase 2 clinical trials. Thus, GST appears to be a potential target for vaccine development. In this study, we have evaluated whether GST from *Brugia malayi* could be developed as a vaccine candidate against lymphatic filariasis.

Research/study plan

Initially, we cloned Bm GST from *B. malayi* L3 cDNA libraries, expressed and purified the recombinant protein. We then determined whether putative immune individuals carry antibodies against rBm GST. For this, we measured the antibody levels and isotype responses. After confirming the presence of anti-Bm GST antibodies in immune individuals, we evaluated the prophylactic potential of rBm GST in a mouse model of lymphatic filariasis.

Methods

Bm GST genes were amplified from Bm L3 cDNA libraries using insert-specific primers flanking Xho I and EcoR1 restriction sites. Amplified PCR products were cloned in pRSET A vector. Following this, expression of Bm GST plasmid was transformed to BL21 (DE3) plysis *S. E. coli* host and recombinant Bm GST was purified using a cobalt IMAC column. Immune reactivity and antibody isotype in individuals from endemic areas were determined using an ELISA. For determining the vaccine potential, four-week-old Balb/C mice were immunized with rBm GST using alum as adjuvant. Animals injected with alum alone served as controls. Immunized animals were evaluated for antibody titres and antibody isotype using an ELISA. A challenge experiment was performed with a micropore chamber method using 20 *B. malayi* infective larvae. Forty-eight hours after implantation, worm recovery was used to determine percent killing. Antibody and cytokine responses in these vaccinated animals were determined using an ELISA, RT-PCR, ELISPOT, lympho proliferation and a DNA microarray.

Results

A 697 bp Bm GST was isolated from *B. malayi* L3 cDNA, cloned in T7 expression vector pRSET A and sequenced to confirm its proper orientation. A 28 kDa rBm GST protein was purified. This protein showed significant seroreactivity with putatively immune endemic normals. Isotype profiles of these antibodies showed a predominant IgG1 response in immune endemic normal individuals. We then immunized Balb/c mice with rBm GST and evaluated protection. These vaccine studies showed that 72.4% protection could be achieved against a challenge infection with *B. malayi* in immunized animals. Antibody and cytokine responses in these protected animals appeared be a combination of Th1 and Th2 type related genes.

Conclusion

Studies presented above show that rBm GST is a potential vaccine candidate against lymphatic filariasis and can confer up to 72% protein against a challenge infection. The protection conferred appears to be mediated by a mixed Th1-Th2 pathway.

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Molecular Cloning, Characterization and Evaluation of Tetraspanin Protein as a Vaccine Candidate Against Lymphatic Filariasis

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Purpose/hypothesis

The purpose of this study was to evaluate the vaccine potential of a novel filarial tetraspanin (TSP) protein in a mouse model. Previous studies showed that parasite-derived tetraspanins are surface-associated, immunodominant antigens, conferring significant protection in animal models. Hence, we hypothesized that filarial tetraspanin will also have a protective role in lymphatic filariasis.

Research/study plan

In the present study, we cloned the extracellular domain of TSP which contains both B- and T-cell epitopes from *B. malayi* adult female cDNA libraries, expressed in *E. coli* and purified the recombinant protein by IMAC. Prophylactic efficacy of rBmTSP was evaluated by micropore chamber and in vitro ADCC methods. Characteristics of the protective responses were also determined in Balb/C mice by measuring the levels and isotype of antibodies and evaluating the cytokine responses.

Methods

Bm TSP gene was amplified from Bm L3 cDNA libraries using insert-specific primers flanking BamHI and HindIII restriction sites. Amplified PCR products were cloned in pRSET A vector. For expression, Bm TSP plasmid was transformed to BL21 (DE3) pLys S *E. coli* host. Expressed protein was purified by cobalt IMAC column. For protection studies, four-week-old Balb/C mice were immunized with r Bm TSP using alum as adjuvant. The alum-only group served as control. Antibody/isotype responses were characterized by an indirect ELISA. Micropore chamber method using 20 *B. malayi* infective larvae was used as a challenge to measure vaccine-induced protection. Forty-eight hours after challenge, chambers were removed to determine the percentage of cytotoxicity. In vitro ADCC was also performed by incubating 20 L3 in peritoneal exudates cells (PEC), followed by addition of either with immunized sera or preimmune sera. After 48 hours of incubation, L3 was observed under microscope for cellular adherence and for larval viability. Characteristics of the protective immune responses were determined by evaluating the antibody and cytokine responses using ELISA, ELISPOT, real time PCR and protein array studies.

Results

A 212 bp fragment (extracellular domain) of Bm TSP was isolated from *B. malayi* L3 cDNA, cloned in T7 expression vector pRSET A and sequenced to confirm its proper orientation and authenticity. After expression, a 14 kDa r BmTSP was purified and was used as an immunogen for vaccine studies. Challenge experiments using the micropore chamber method showed that nearly 77.5% protection could be achieved following vaccination of mice with rBmTSP. In vitro studies using immune sera and PECs showed that 56.3% killing of the larvae occurred in the presence of anti-Bm TSP antibodies, compared to only 1.2% when control sera was used. Characteristics of the protective responses as measured by lympho proliferation and real time PCR were of both Th1 and Th2 type. Protein array studies also confirmed these results.

Conclusion

We show, for the first time, that immunization of mice with r BmTSP conferred significant protection against a challenge infection. Thus, rBmTSP is another promising vaccine candidate antigen for the control of lymphatic filariasis.

***Morinda citrifolia* (Noni) Reduces the DNA Damage and Oxidative Status in Current Smokers**

Purpose/hypothesis

Cigarette smoke is a known, leading, preventable cause of smoking-related diseases, including cancer. In 2006, an estimated 170,000 cancer deaths in the US were caused by tobacco smoke. Approximately 45 million Americans are current smokers. Elevated blood DNA-adduct levels and oxidative status are associated with cancer risk, while high intake of fruits and vegetables reduces cancer risk in current smokers. *Morinda citrifolia* (noni) has been reported to have versatile therapeutic effects. Previous studies have demonstrated that noni juice made from noni fruits in Tahiti (TNJ) is anti-oxidative, anti-inflammatory, anti-carcinogenic and anti-angiogenic. We hypothesize that TNJ is able to reduce the DNA damage and oxidative status caused by cigarette smoke.

Research/study plan

A power analysis was performed to estimate the number of cases needed to detect a significant effect. A randomized, double-blind, placebo-controlled, IRB-approved clinical trial was conducted at the College of Medicine at Rockford campus from 2000 to 2005 to examine our hypothesis. Healthy individuals, aged 18 to 65 years old, smoking 20 cigarettes or more per day for more than one year, with no usage of prescribed medicine or antioxidant vitamins in the last three months, were eligible for this clinical trial. Participants were randomly assigned to 1-oz or 4-oz TNJ groups, or 4-oz placebo groups on a 1:1 ratio of male to female. Study subjects were asked to sign a consent form and complete two questionnaires pre- and post-trial.

Methods

Study participants in the 1-oz group were asked to drink one ounce of TNJ in the morning on an empty stomach. Those in the 4-oz group were asked to drink two ounces of TNJ twice a day, one in the morning on an empty stomach, and one before bedtime. A 10 ml sample of whole blood was drawn from each participant pre- and post-trial for the determination of the DNA damage and oxidative biomarkers. Peripheral blood lymphocyte aromatic-, lipid peroxide (LPO)-, and malondialdehyde (MDA)-DNA adduct levels were analyzed by a 32P post-labeling assay. Plasma superoxide anion radical (SAR) and lipid hydroperoxide (LPO) levels were determined by tetrazolium nitro blue (TNB) and leucomethylene blue (LMB) assays, respectively.

Results

A total of 254 smokers from the 317 enrolled completed this one-month trial. The average cigarette usage was $1.39 \pm$ packs per day and average age was 40 ± 10.81 . Paired student's t-test was used for data analysis. The results indicated that the aromatic, LPO, MDA adducts, SAR and LPO levels were significantly reduced by 44%, 50%, 40%, 27% and 28%, respectively, after one month of the 1-oz and 4-oz TNJ trial. Placebo did not reduce these biomarkers; instead there was a slight increase. By stratified data analysis, TNJ groups showed no dose-response or gender difference. There was no side effect observed in the TNJ and placebo groups.

Conclusion

This clinical trial has demonstrated that TNJ is able to reduce the DNA damage and the oxidative status caused by cigarette smoke, therefore TNJ may decrease the risk of smoking-related diseases.

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Primary Prevention of Overweight and Obesity: An Analysis of National Survey Data

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Purpose

Obesity is approaching tobacco as the leading cause of preventable morbidity and mortality. Healthcare providers have the opportunity to address this through primary prevention strategies. The purpose of this study was to assess whether healthcare professionals provide primary prevention for overweight and obesity by examining the percent of healthy weight individuals (body mass index (BMI)=18.5-24.9 kilograms/meter²) who report being advised to maintain a healthy weight.

Research/study plan

This study is a cross-sectional analysis of 2003 Behavioral Risk Factor Surveillance Survey (BRFSS) data.

Methods

BRFSS is a cross-sectional, random-digit telephone survey that is a collaborative project of the Centers for Disease Control and Prevention (CDC) and all US states and territories. The survey's objective is to collect uniform, state-specific data on non-institutionalized adults' preventive health practices and risk behaviors. Data are self-reported responses to mostly forced-choice questions. 2003 data were used because they were the most recent data collected where the weight management module questions were asked of all respondents from all states. Reported analyses used weighted data to provide a stratified representation of the US adult population. A multivariate logistic regression model was tested to characterize US adults receiving primary prevention. Alpha was set at .05 for all tests of statistical significance. All analyses were conducted using SPSS 15.0 (Chicago, Illinois).

Results

Among healthy BMI respondents, only 2.6% reported receiving primary prevention. Logistic regression analyses yielded that healthy weight adults receiving primary prevention were more likely to report: being 18 to 49 years of age, annual household incomes of less than \$35,000, having at least one comorbidity, having a healthcare provider, changed eating habits to include less fat or fewer calories and using physical activity to maintain or lose weight. Men were also more likely to receive primary prevention.

Conclusion

Only a very small proportion of healthy weight adults received primary prevention, which suggests that physicians are missing opportunities to help address the epidemic of adult obesity in the US.

Awareness of Heart Attack and Stroke Symptoms Among Hispanic Males

Purpose/hypothesis

There is clear evidence that Hispanic men are a high-risk group for treatment delay for both heart attack and stroke. More targeted research is needed to elucidate this specific population's knowledge of warning signs for these acute events. This study sought to describe within-group disparities in Hispanic men's knowledge of heart attack and stroke symptoms.

Research/study plan

The data were cross-sectional and focused on health-risk factors and behaviors. The research participants were US male Hispanic adults aged 18-99. The main outcome measure for the study was heart attack and stroke symptom knowledge score.

Methods

Multivariate techniques were used to analyze a multi-year Behavioral Risk Factor Surveillance Heart and Stroke module database.

Results

Multivariate logistic regression analysis yielded that Hispanic men older than 18 years of age, who earned low scores on the composite heart attack and stroke knowledge questions (range 0-8 points), were more likely to: have less than a high school education, have deferred medical care because of cost, not have a primary care provider and be uninsured.

Conclusion

There were significant within-group differences. Targeting educational efforts toward Hispanic men older than 55 years of age with less than high school education, those who do not have a primary care provider or health insurance, and who were deferring healthcare because of cost could be ways to improve the outcome of acute vascular events among the Hispanic adult male population.

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Human DC-SIGN and Mouse SIGN-R1 Are Dendritic Cell and Macrophage Receptors for the Rough LPS of *Yersinia pseudotuberculosis*

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Purpose/hypothesis

The purpose of this research is to test the hypothesis that the dendritic cells (DCs) and macrophages use the DC-SIGN or SIGN-R1 receptors to capture *Yersinia pseudotuberculosis*, while the bacteria get an expanded ability to disseminate by exposure the core LOS/LPS.

Research/study plan

Yersinia pseudotuberculosis is able to disseminate to regional lymph nodes. This bacterium expresses an O-antigen, which is, however, suppressed when grown at 37 °C, presumably to expose the core lipopolysaccharide (LPS). We will check the ability of bacteria to invade antigen-presenting cells (APCs) under different conditions.

Methods

Y. pseudotuberculosis, cultured at 37 °C, but not 26 °C, can invade two types of APCs; human dendritic cells (DCs) and mouse macrophages. We further demonstrate that O-antigen mutants of *Y. pseudotuberculosis* cultured at 26 °C have the ability to invade human DCs, human alveolar macrophages, mouse macrophages and human DC-SIGN- or mouse SIGN-R1-expressing transfectants. Finally, we show that the *Y. pseudotuberculosis*-SIGN-R1 interaction occurs in vivo in a mouse model.

Results

Rough, rather than smooth, strains of *Y. pseudotuberculosis* serotype O:1b are able to interact with DCs, alveolar macrophages and interaction most probably via a specific-core LPS-DC-SIGN or core LPS-SIGNR1.

Conclusion

This study indicates that the suppression of O-antigen expression during an in vivo infection may represent a key step in virulence of *Y. pseudotuberculosis*, increasing its ability to disseminate.

Prevalence of Amblyogenic Risk Factors in Siblings of Patients with Accommodative Esotropia

Purpose/hypothesis

Children with accommodative esotropia may have siblings with significant hyperopia, astigmatism and strabismus. However, previous studies have not examined risk factors for amblyopia and strabismus in siblings in a prospective fashion.

Research/study plan

We examined 81 proband children with accommodative esotropia and 115 siblings aged 10 or younger. Criteria for significant ocular findings in siblings included any of the following: spherical refractive error greater than or equal to +3.0 D in either eye; astigmatism greater than or equal to 2.0 D in either eye; anisometropia greater than or equal to 1.0 D and/or any strabismus.

Methods

Prevalence of above criteria was computed with confidence intervals weighted by family size.

Results

In siblings, 42.0% (95%; CI 33.0-50.9%) had significant ocular findings: strabismus, 14.8% (95%; CI 8.3-21.3%); hyperopia greater than or equal to 3 D, 31.3% (95%; CI 23.4-40.4%); astigmatism greater than or equal to 2 D, 6.5% (95%; CI 3.3-12.9%); and anisometropia greater than or equal to 1 D, 14.3% (95%; CI 8.6-23.0%).

Conclusion

Siblings of children with accommodative esotropia have a higher prevalence of strabismus and amblyogenic risk factors. Parents and insurers should continue to be informed regarding the importance of adhering to the referral policies advocated by the American Academy of Ophthalmology.

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Validity of a Novel Web-Based Vision Screening Tool

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Purpose/hypothesis

Amblyopia is the leading cause of monocular blindness in adults aged 20 to 70. Early recognition and referral are crucial, especially during infancy and childhood, to prevent permanent vision loss. The Internet is still a relatively untapped resource for vision screening, and holds the potential for widespread, free testing, if it can be validated for home use without the assistance of a trained examiner. The purpose of our study was to establish the validity of a novel Web-based vision screening tool developed at the University of Iowa.

Methods

In this prospective study, we enrolled a combined total of 204 patients and accompanying siblings between the ages of 3 and 12 who presented to the pediatric ophthalmology clinic of the University of Iowa. Each study subject's vision was tested twice in a randomized fashion: once using the Web-based vision screening tool administered by the parent, and once using the EVA (electronic visual acuity tester) protocol administered by a trained orthoptist. Frequency data, as well as sensitivity, specificity values and ROC curves, were computed with SAS v. 9.0.

Results

At a specificity of 91.3%, the Web-based vision screening tool has a sensitivity of 71.4%.

Conclusion

This is the first study to show that Web-based vision screening is possible. It is free, accessible, user-friendly, valid when used in a controlled environment and able to incorporate patient education. Future testing and development should occur in a variety of settings.

Murine SIGN-R1 Is a Receptor for *Yersinia pestis* That Promotes Phagocytosis by Macrophages

Purpose/hypothesis

The mechanism of *Y. pestis* hijacks antigen presenting cells (APCs) such as macrophages in order to be delivered to lymph nodes to initiate disease.

Research/study plan

Macrophages express several C-type lectin receptors, which can interact with core lipopolysaccharide (LPS) ligand of several Gram-negative bacteria. Therefore, it is possible that *Yersinia pestis*, whose core LPS is naturally exposed, might exploit SIGN-R1, a C-type lectin, to invade macrophages.

Methods

In this study, we present evidence that murine SIGN-R1 is a receptor used by *Y. pestis* to bind to macrophages and be internalized via phagocytosis. The invasion of macrophages by *Y. pestis* is, in part, dependent on exposed core LPS. SIGN-R1-expressing transfectants, but not their negative counterparts, phagocytose *Y. pestis*. The interaction between *Y. pestis* and SIGN-R1 can be inhibited by anti-SIGN-R1 antibody. Finally, we present data suggesting that the *Y. pestis*-SIGN-R1 interaction does occur in vivo.

Results

Y. pestis can invade macrophages by interaction of core LPS and SIGN-R1 receptor.

Conclusion

This study has demonstrated that mSIGN-R1 is a cellular receptor for *Y. pestis*. Since hDC-SIGN and mSIGN-R1 share a similar ability to interact with core LPS, we speculate that *Y. pestis* may hijack APCs, through in part, the core LPS-SIGN-R1 interaction, to traffic to lymph nodes, utilizing a similar mechanism as demonstrated in HIV-hDC-SIGN interaction. The knowledge acquired from this study may allow us to develop novel strategies to combat this bacterial pathogen by blocking the interaction between *Y. pestis* and host receptors.

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Pregnancy-Associated Breast Cancer: Significance of Early Detection

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Purpose/hypothesis

Pregnant and lactating women are an unlikely population when considering breast cancer as a differential diagnosis. Pregnancy-associated breast cancer (PABC) is defined as cancer of the breast during pregnancy and up to one year postpartum. Compared with early diagnosis, a delay in breast cancer diagnosis is frequently associated with increased tumor size, higher tumor grade and higher mortality. The aim of this integrative review of the literature is to determine: 1) when during the perinatal period PABC is most prevalent and the average delay of diagnosis and 2) what factors contribute to delay in diagnosis of PABC by healthcare providers.

Research/study plan

To understand the healthcare provider decision-making process in the diagnosis of PABC, Offredy's hypothetico-deductive model was used.

Methods

Pubmed, CINAHL databases were searched to identify research of women with PABC using the following key words: PABC, gestational breast cancer, breast cancer during pregnancy and lactation. Ten studies published between 1988 and 2005 were included in the review.

Results

Pregnant or lactating women diagnosed with PABC were found to be between the ages of 23 and 41. Delay in diagnosis of PABC ranged from one to six and one-third months in the pregnant woman and up to 16 months in the lactating woman. The delays resulted in complications such as axillary lymph node metastasis, high-grade tumors at diagnosis and poor outcomes.

Discussion

Compared with delayed diagnosis, early detection was a significant predictor of improved outcomes. Providers and pregnant women do not expect to find breast cancer during pregnancy and lactation. Symptoms that would normally initiate a breast cancer diagnostic and treatment pathway in non-pregnant women are often thought to be due to normal breast changes in pregnancy. Healthcare providers must consider breast cancer as a differential diagnosis when a woman presents with a breast mass during pregnancy and lactation.

Secondary Prevention of Overweight and Obesity: An Analysis of National Survey Data

Purpose/hypothesis

Approximately 55% of US adults are either overweight or obese. Primary care providers have the opportunity to address this pandemic through primary, secondary or tertiary prevention strategies. The study objective was to assess whether primary care professionals were providing secondary prevention for overweight and obesity by examining the percent of overweight and obese individuals who reported being advised to lose weight.

Research/study plan

This was a cross-sectional study.

Methods

Multivariate regression was performed in a cross-sectional study analyzing 2003 Behavioral Risk Factor Surveillance Survey data. Study participants were US adults older than 18 years of age.

Results

A total of 7.4% of obese and 11.0% of overweight respondents received secondary prevention. Logistic regression analyses yielded that overweight or obese adults receiving secondary prevention were more likely to report: being 18 to 49 years of age, living in households with an annual income less than \$35,000, having at least one comorbidity, having a primary care provider, having changed their eating habits to include less fat or fewer calories and that they were using physical activity to maintain or lose weight. Males were more likely to receive primary prevention and females secondary prevention.

Conclusion

Fewer than 50% of overweight and obese adults reported being advised to lose weight, suggesting that physicians are missing opportunities to help address the epidemic of adult obesity in the US.

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Tobacco Education for Pecatonica Middle School Children

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Purpose/hypothesis

The purpose of this study is to assess the knowledge of Pecatonica middle school-aged children concerning the health, social, and financial risks of tobacco use and to educate them further on the risks associated with tobacco products.

Currently, smoking is the number one cause of preventable death in America, and at least 50% of people who smoke started before they were 16 years old. This research can guide administrators in the Pecatonica school district when designing curriculum to address educational deficits of students concerning tobacco risks.

Methods

Students will be given an anonymous pre-test preceding a lecture/interactive game, and post-test following a lecture on tobacco products. The pre-test will be designed to assess misconceptions about tobacco products or simply lack of knowledge. The post-test will assess the effectiveness of the lecture and interactive game in communicating information about tobacco products.

Results

In process.

Conclusion

In process.

Comparison of Contraceptive Choices in Metropolitan and Non-metropolitan US Adults Aged 18 to 55 Years: An Analysis of 2004 Behavioral Risk Factor Surveillance Survey Data

Purpose/hypothesis

Even though sexually active US adults wanting to prevent pregnancy have a wide variety of birth control methods readily accessible to them, there is almost no research regarding the contraceptive choices of non-metropolitan US adults in comparison to metropolitan adults. This study sought to compare the birth control choices of these two groups. Analysis included a number of socially relevant, independent variables including: race/ethnicity, household income, gender, educational attainment and marital status. Health services variables (health insurance status, whether or not children under the age of 18 were living in the household, deferring medical care because of cost and having a personal healthcare provider) were also included in the analyses.

Research/study plan

To answer the research question, multivariate techniques were used to analyze the 2004 Behavioral Risk Factor Surveillance Survey (BRFSS) database.

Methods

BRFSS is a cross-sectional, random-digit telephone survey that is a collaborative project of the Centers for Disease Control and Prevention (CDC) and all US states and territories, targeting adults 18 through 99 years of age. Seven original BRFSS variables — age, education, annual household income, marital status, race/ethnicity, birth control method used and reasons for not using birth control — were re-coded for the analyses presented here. Data were collected in multiple categories. To generate more meaningful analyses, this approach required collapsing the multiple response categories into fewer categories. Metropolitan or non-metropolitan place of residence was determined by computing a state/county Federal Information Processing Standard (FIPS) from individual state and county FIPS codes, and then re-coding the state/county FIPS code as either metropolitan or non-metropolitan, based on 2003 Rural-Urban Continuum Codes from the US Office of Management and Budget (OMB).

Results

Multivariate regression analysis using “use of birth control” as the dependent variable yielded that non-metropolitan adults between the ages of 18 and 55 were more likely to use female sterilization, male sterilization, and non-injectable and injectable hormones for birth control than their metropolitan counterparts. They were less likely to use condoms, a diaphragm or Nuvo ring, emergency contraception, or withdrawal or rhythm methods. In addition, in comparison to metropolitan adults, non-metropolitan persons younger than 35, those who had children younger than 18 living with them, those who are part of a couple, males and those living in households with income of less than \$35,000 were more likely to report using some form of contraception.

Conclusion

The analyses presented here should prove useful to healthcare providers, as well as public health family planning programs.

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Healthcare Careers Promotional Project

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Purpose/hypothesis

The purpose of the project is to: 1) assess the current career goals/aspirations of high school students; 2) determine high school students' current knowledge and perceptions of health careers and 3) increase student awareness and understanding of health careers through interactive and informational presentations. A recently published survey of high school seniors found certain barriers that students may face, including lack of awareness of the various health careers. This project addresses rural high school students' lack of knowledge regarding career options in the health fields, and offers methods to educate them about their options.

Research/study plan

It was suggested in a 2004 article in *The Association of Perioperative Registered Nurses* journal that students lump all healthcare jobs together, and that they need information at a very basic level (Durrance, et al, 2004). Several articles published in the *Australian Journal of Rural Health* in 2003 show that a major barrier for students choosing health careers is a lack of information about the range of health careers available. Durey, et al, reported results that students indicated a need for interactive methods of delivery of health career information. They also suggested the importance of interaction with health professionals and university students as an effective way to deliver information about health careers. Career advisers also rate access to health professionals and undergraduate health students as the most effective motivator for assisting students in their decisions to pursue health careers.

An interactive farm injury scenario and a PowerPoint slide presentation were developed. The scenario was scripted and allowed students to make suggestions of the roles of various health professions at the scene of a mock injury. The slide show provided information on each profession's job description, educational requirements and average salary. An anonymous, voluntary, one-page (back and front) pre- and post-evaluation survey was provided to all students. Students also had the option of filling out a separate form requesting more information on any of the health careers discussed.

Methods

Science students at the Marshall, Illinois, high school participated in a 45-minute presentation about health careers. The learning objectives developed for the students were: 1) to familiarize students with all 17 health careers presented, including a basic job description, educational requirements and average annual salaries and 2) to provide access to additional information on a particular career and a health professions liaison. The pre- and post-presentation evaluation surveys will be used to assess whether the learning objectives were reasonably met, as well as to gain feedback from the students regarding the format of the presentation.

Results

In process.

Conclusion

In process.