

# Student Nurses Participate in Public Health Research and Practice Through a School-Based Screening Program

Christine A. Brosnan, Sandra L. Upchurch, Janet C. Meininger, Lynne E. Hester, Gwen Johnson, and Mona A. Eissa

**ABSTRACT** Obesity has reached epidemic proportions among children in minority populations, placing them at risk for diabetes and hypertension. The importance of educating a generation of nurses who have the knowledge, skills, and passion to address this public health need is crucial to the profession and to America's health. This article describes the use of a Community Partnership Model to frame baccalaureate nursing students' (B.S.N.) service learning within the context of a research study to screen middle- and high-school students for health risks. The missions of education, research, and practice are linked together in the model by three processes: evidence-based practice, service learning, and scholarly teaching. The aim of the project was early identification of obesity, hypertension, and type 2 diabetes and their predictors in a high-risk student population, between 12 and 19 years of age. Early evidence indicates that the model is feasible and effective for directing student learning and addressing public health problems in the community.

Key words: adolescents, nursing, obesity, screening, service learning.

Rates of obesity in children are now two to three times greater than they were in 1970 (Ebbeling, Pawlak, & Ludwig, 2002). While obesity has increased significantly among the general pediatric population,

African American and Hispanic children have experienced the greatest gain (Strauss & Pollack, 2001). Reasons for this increase are varied and include both genetic and lifestyle factors, but regardless of the cause there is strong evidence that children who are obese are at high risk for metabolic and cardiovascular problems including insulin resistance, type 2 diabetes, and hypertension (Arslanian, 2000; Brosnan, Upchurch, & Schreiner, 2001; Sorof, Poffenbarger, Franco, Bernard, & Portman, 2002).

*Christine A. Brosnan, Dr.P.H., R.N., Nursing Systems Department, School of Nursing, University of Texas Health Science Center-Houston, Houston, Texas. Sandra L. Upchurch, Ph.D., C.D.E., R.N., Nursing Systems Department, School of Nursing, University of Texas Health Science Center-Houston, Houston, Texas. Janet C. Meininger, Ph.D., FAAN, R.N., Nursing Systems Department, School of Nursing, University of Texas Health Science Center-Houston, Houston, Texas. Lynne E. Hester, M.S., R.N.C., C.N.S., Nursing Systems Department, School of Nursing, University of Texas Health Science Center-Houston, Houston, Texas. Gwen Johnson, M.Ed., R.N., Aldine Independent School District, Houston, Texas. Mona A. Eissa, M.D., Ph.D., Department of Pediatrics, School of Medicine, University of Texas Health Science Center-Houston, Houston, Texas.*

*Correspondence to:*

*Dr. Christine A. Brosnan, Assistant Professor, School of Nursing, University of Texas Health Science Center-Houston, 6901 Bertner Street, Suite 711, Houston, TX 77030. E-mail: christine.a.brosnan@uth.tmc.edu*

## The Role of the Public Health Nurse

It is critical to the profession and to America's health that student nurses have community clinical experiences that provide insight into these problems. Working with people where they live, that is, homes, schools, or workplaces, to screen for disease and to help individuals make lifestyle choices that affect their health is at the center of nursing's expertise. Nurses must develop the research skills to collaborate in scholarly projects that expand

current knowledge so that we can build a record of how successful lifestyle and environmental changes are made. Communities that work in partnership with public health care providers and researchers to address healthy lifestyles and environments have shown, to date, the best outcomes (Institute of Medicine, 2000). This article describes the use of the Community Partnership Model to frame baccalaureate nursing students' (B.S.N.) service learning within the context of a research study to screen middle- and high-school students for health risks.

## Community Partnership Model

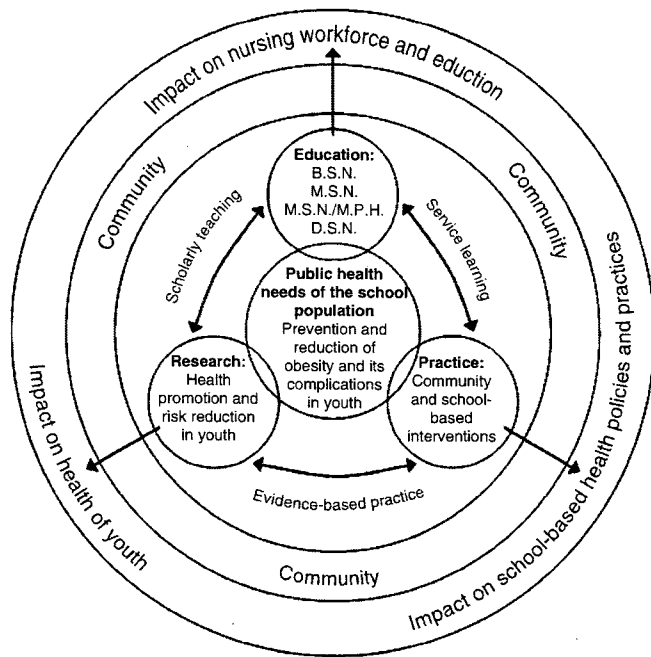
To guide this school-based project as well as other health-related initiatives, one of the coauthors (J.C.M.) developed the Community Partnership Model (Fig. 1). Education, research, and practice—the missions of the University of Texas Health Science Center-Houston—are represented in the model by three overlapping circles that surround the core focus of this project: detection, prevention, and reduction of obesity and its complications in youth. The missions of education, research, and practice are linked together in the model by three processes: evidence-based practice, service learning, and scholarly teaching.

Evidence-based practice skills (linking research and practice) are fostered by working with students to critically examine the evidence for effectiveness and cultural specificity of intervention strategies to meet identified community needs (Brown, 1999; Meininger, 1997, 2000). The principles of service learning (linking education and practice) transform traditional community health experiences so that they provide structured opportunities for students to address community needs, involve the students in critical reflection about the community's needs and their professional roles in relation to these needs, and incorporate the concept of reciprocity between the needs of the service learner and those of the community and individuals served (Jacoby, 1996; Matteson, 2000; Poirrier, 2001). Scholarly teaching (linking research and education) is reflected in the rigorous approaches to evaluating outcomes of the project, not only for the students involved, but also for the community served (Brown et al., 1995).

A larger circle encompasses the missions of the university and signifies that this project is embedded in the community (Anderson & McFarlane, 2000). Instead of focusing solely on the learning needs of the students and the pedagogical preferences of the faculty, as in a traditional approach to nursing education, this project focused on the health needs of the partner in this project, a large urban school district in Texas. At the outer edges of the model, this community partnership model incorporates the areas in which the project is expected to have an impact: the nursing and nursing education workforce, the health of youth in Texas, and school-based health policies and practices.

Within the context of this model, the community could be defined narrowly as the school district personnel and students; at an intermediate level to incorporate the families of the students and the immediate geographic areas surrounding the target schools; or more broadly to incorporate the social, political, and physical environments that impact the target community. Our interventions at this point are focused narrowly on the school district and its students; our assessment activities are more far reaching, however, and extend to the neighborhoods and institutions in the geographic areas surrounding the schools.

The model does not specify the nature of the community involvement, which may vary across a wide range of possibilities from viewing the community as the setting, the target, the resource, or the agent of change (McLeroy, Norton, Kegler, Burdine, & Sumaya, 2003). We have designed this experience so that it is much more than a learning experience in a community setting. The health status of the community is the target, in this case the detection, reduction, and prevention of obesity in youth. It also has elements of the community as resource; we have designed and implemented the project in partnership with the school district personnel and a high degree of participation on the part of the teachers, coaches, school nurses, and students in individual schools. As we expand this project, our aim was to build toward the community as the agent of change by focusing on its strengths and to reinforce its capacity to address health issues (Israel et al., 2003). Obviously, this is a long-range goal and we are seeking funds to carry out a comprehensive, participatory assessment of the community's perceptions, values, strengths, and resources in relation to the health of youth.



**Figure 1.** Community Partnership Model to Meet Public Health Needs of the Population through Nursing Education, Practice, and Research.

## Putting the Model into Practice

This screening program was part of a community-based research project and focused on the health needs, as identified by school personnel and health care providers, of middle- and high-school students in an urban school district. The aim of the research project was early identification of obesity, hypertension, and type 2 diabetes and their predictors in a high-risk student population, between 12 and 19 years of age. The ethnicity of the school population screened was 52% African American (not of Hispanic origin), 38% Hispanic, 5% non-Hispanic White, and 5% other. It was a collaborative project involving faculty from the University of Texas Health Science Center (UTHSC)-Houston School of Medicine and School of Nursing and school nurses and physical education (PE) teachers from a large school district in Texas.

The screening program included two stages: initial screening of all students who agreed to participate and follow-up evaluation of obese students and those with elevated blood pressure (BP). B.S.N. students in the generic program at UTHSC-Houston School of Nursing were responsible for all the initial screening activities as part of their senior level com-

munity nursing course during the spring semesters of 2002 and 2003. During the initial screen, nursing students measured height, weight, waist circumference, hip circumference, and BP, and observed for the presence of acanthosis nigricans in children of selected target schools. Acanthosis nigricans is a marker for insulin resistance and has been detected in 70–90% of children with type 2 diabetes. It appears as velvety, hyperpigmented patches on the skin, most commonly found on the neck, groin, and axilla (American Diabetes Association, 2000; Jones, 1998; Stuart et al., 1998). A short health history for each student was also completed.

All parents received a letter about the screening results regardless of whether the findings were normal or abnormal. Students with abnormal results were referred to their health care providers or to a nearby adolescent clinic providing free medical service that is administered by one of the authors (M.E.). Referral criteria included a BMI equal to or above the 85th percentile for age and gender, a mean BP equal to or above the 95th percentile for height and gender, and the presence of acanthosis nigricans. Nursing students did not participate in follow-up evaluation or treatment.

This collaboration between a school district and a university allowed for the mission of the university (education, practice, and research) to be accomplished and the health of the children of the school district to be addressed.

### ***Evidence-based practice: linking practice and research.***

Guided by the Community Partnership Model, students critically examined the literature to determine the extent of obesity, diabetes, and hypertension in children. Nursing students were shown how to search the literature online using key variables. They were taught how to refine and limit their searches and how to access such useful databases as Medline, the Cumulative Index of Nursing and Allied Health Literature (CINAHL), and the Cochrane database. Medline and CINAHL contain an extensive collection of published references from medicine, public health, nursing, and the allied health sciences. The Cochrane database provides studies (published and unpublished) that synthesize literature such as systematic literature reviews and meta-analyses. As an example, nursing students identified obesity as the leading

health concern in the area and they developed the question, "What is the prevalence of hypertension among obese youth?" They examined the research literature, found articles that addressed their question, generated a matrix to organize the studies, and synthesized their findings (Brown, 1999). This review enabled students to understand more fully the relation of hypertension and obesity, and to examine the linkage among these problems and gender, ethnicity, culture, and socioeconomic status.

In another example of how the Community Partnership Model guided the linkage of practice and research, nursing students were directly involved as data collectors in a research project. Approval for the project was obtained from the University Committee for the Protection of Human Subjects (CPHS) prior to data collection. A new university policy requiring that everyone involved in a research project submit certificates of training in the protection of human subjects went into effect during the Fall of 2002. Community nursing students in Spring 2003 completed an online ethics course offered through the U.S. Department of Health and Human Services, *National Institutes of Health* at <http://www.nih.gov>. Course objectives included the development of ethical guidelines, the meaning of informed consent, the criteria studies must meet for approval by the CPHS, and policies related to international research. Nursing students received a certificate that they submitted to course faculty after completing the 3-hr course and passing a test.

The nursing students also participated in a 6-hr training session developed by the study investigators. The first hour of training included an overview of the project and a discussion of the problems of obesity, diabetes, and hypertension among adolescents at the national and local level. Nursing students received a training manual that described the protocols included in the screening project and the instruments that were to be used. The faculty demonstrated each protocol and the nursing students then practiced with a peer partner. Because data were entered at the school sites, they also practiced entering data into an Excel program on a laptop computer. Once nursing students felt confident with the protocol, the faculty checked each student individually for competence.

Height and weight were measured using the protocol described by the Centers for Disease Control and Prevention (<http://www.cdc.gov/nccdphp/>

[dnpa/bmi](http://www.cdc.gov/nccdphp/)); the Bogalusa Heart Study protocol was used to measure waists and hips (Freedman, Serdula, Srinivasan, & Berenson, 1999); and the presence or absence of acanthosis nigricans was observed using the criteria developed by Stuart, Pate, and Peters (1989). BP and pulse rate were obtained with an ambulatory BP monitor (Spacelabs 90207), an automatic device that uses an oscillometric technique. Oscillometric devices are easy to use and may be less prone to error in technique compared to other types of devices (Pickering, 2002). This was an important advantage in the current study in which a large number of data collectors screened hundreds of children during a school day. The protocol described in the Task Force Report (National High Blood Pressure Education Program Working Group on Hypertension Control in Children and Adolescents, 1996) was used to measure BP.

Middle- and high-school students were given consent forms for their parents and for themselves in both English and Spanish. A passive consent form was used for the initial screen because the tests were not invasive and were tests that were normally done in a school setting. This means that parents and their children were provided information about the study and returned the signed form only if they declined participation.

### ***Service learning: linking education and practice.***

The service learning experience linked the needs of a school district to address the health risks of its students and the School of Nursing's need for students to meet the course objectives for a senior level community health nursing course. School nurses and PE coaches were keys to the program's effectiveness. Despite a busy schedule, they were very interested in facilitating the project and provided valuable feedback. School nurses met with nursing students in Fall 2002 and discussed ways to increase student and parent participation in the screening program. They scheduled health education projects that nursing students presented in the schools, placed a notice in the school newsletter about the upcoming screening, and followed-up with students who had abnormal findings. The PE coaches distributed all the consent forms, helped maintain order during screening, and kept track of who had and who had not been screened.

Four clinical groups of 10 students each participated in the project: 20 nursing students screened on Tuesday and 20 nursing students screened on Friday during a 6-week period. Nursing students arrived about one-half hour before the school started, to set up equipment and for additional reliability checks to assure that they were following the protocol.

Before beginning the process, nursing students described the protocol and provided pencils and the questionnaire. Middle- and high-school students then moved through five screening stations. Students were weighed and measured at the first station and at the second station, waist, hip, and arm (for correct BP cuff size) circumferences were measured. Students were checked for acanthosis nigricans at the third station and BP and pulse were measured at the fourth station. Nursing students measured BP and pulse three times 1 min apart. The average of the three measurements was used. Faculty closely monitored student activities. For example, acanthosis nigricans can be difficult to identify; consequently, a positive identification by a nursing student required the agreement of a faculty member.

Students were screened during PE classes. Obesity and its complications involve body image and privacy for students is essential. Screening stations were positioned far enough apart to maximize privacy and yet permit a rapid flow. Students were asked to remain at a distance from their peers to further ensure privacy. Nursing students screened a total of 1,100 middle- and high-school students annually as part of their clinical practicum.

Nursing students were given an opportunity to reflect on the strategies outlined in the protocol and their application to the middle- and high-school students. Discussion during postconference centered on their perceptions of the experience, their interactions with the students, the role of the public health nurse in the schools, and proposals for future intervention strategies that are culturally relevant and realistic.

### ***Scholarly teaching: linking research and education.***

Implementation of the Community Partnership Model include evaluating the process and outcomes of the study to determine strengths and weaknesses. Lessons gleaned from this initial implementation were obtained through de-briefing with students, school officials, district officials, and faculty. Insights

gained will improve learner outcomes and increase benefits to the health of school children within the framework of the Community Partnership Model.

Evaluations of program outcomes and the ability of nurses to meet course objectives were continuous. Course objectives reflect the American Nursing Association Standards for Community Health Nursing practice (American Nurses Association, 1986). They call for a comprehensive population assessment, analysis, plan, and intervention in collaboration with the community. As a group, students prepared a written and oral presentation to their peers about this Community Project. For the assessment phase, nursing students gained firsthand experience observing and interacting with middle- and high-school students during the screenings. They gathered information about student strengths and needs, the perceptions of school personnel, the school environment, and the geographic area surrounding the schools.

The experience was evaluated very positively by nursing students on course evaluations. Their written comments indicated that the experience enabled them to link lecture with clinical practice and increased their understanding of the community as client. Their written summary papers were of excellent quality and were a realistic reflection of the community and of the middle- and high-school population.

The impact on the school community has not been determined because the project is ongoing. Initial findings indicate that the process of having nursing students screen large numbers of middle- and high-school students is feasible and effective. The comparison of findings from the cohort of children screened in the schools to national standards of weight and BP enabled the School District to estimate the risk among their students and to plan for effective interventions based on the needs and culture of the population. The findings provided evidence that obesity in children is a local as well as a national problem.

School personnel were enthusiastic about the manner in which screening was conducted. Screening during PE resulted in no scheduling conflict with academic classes, and the protocol was efficient in that there was minimal disruption to PE activities. School officials noted that the project increased awareness of acanthosis nigricans as a risk factor for insulin resistance and familiarized school nurses with a method for screening. Prior to the project, school children had not been screened for the

condition, but school nurses were able to efficiently implement a district-wide screening program for acanthosis nigricans when it was recommended by the Texas Department of Health.

The Community Partnership Model provided the framework to apply evidence-based practice, service learning, and scholarly teaching to direct student learning and to address public health problems. The continuing partnership between the School District and the University facilitates the mutual trust and consistent interactions needed to progressively expand the collaboration to the benefit of children and adolescents, their families, and the community.

## Acknowledgments

This project was supported by the Texas Higher Education Coordinating Board, Division of Universities and Health-Related Institutions, Minority Health Education and Research Grant Program (MHGP Grant No. MWo6).

## References

- American Diabetes Association. (2000). Consensus statement: Type 2 diabetes in children and adolescents. *Diabetes Care*, 23(3), 381–389.
- American Nurses Association. (1986). *Standards of community health nursing practice*. Kansas, MO: Author.
- Anderson, E. T., & McFarlane, J. (2000). *Community as partner: Theory and practice in nursing* (3rd ed.). Philadelphia, PA: Lippincott.
- Arslanian, S. A. (2000). Type 2 diabetes mellitus in children: Pathophysiology and risk factors. *Journal of Pediatric Endocrinology and Metabolism*, 13(Suppl. 6), 1385–1394.
- Brosnan, C. A., Upchurch, S., & Schreiner, B. (2001). Type 2 diabetes in children and adolescents: An emerging disease. *Journal of Pediatric Health Care*, 15(4), 187–193.
- Brown, S. J. (1999). *Knowledge for health care practice: A guide to using research evidence*. Philadelphia, PA: W.B. Saunders.
- Brown, S. A., Cohen, S. M., Kaeser, L., Levine, C. D., Littleton, L. Y., Meininger, J. C., et al. (1995). Nursing perspective of Boyer's scholarship paradigm. *Nurse Educator*, 20, 26–30.
- Centers for Disease Control and Prevention. (n.d.). *Nutrition and physical activity*. Retrieved April 7, 2003, from <http://www.cdc.gov/nccdphp/dnpa/bmi>.
- Ebbeling, C. B., Pawlak, D. B., & Ludwig, D. S. (2002). Childhood obesity: Public-health crisis, common sense cure. *Lancet*, 360(9331), 473–482.
- Freedman, D. S., Serdula, M. K., Srinivasan, S. R., & Berenson, G. S. (1999). Relation of circumferences and skinfold thicknesses to lipid and insulin concentrations in children and adolescents: The Bogalusa Heart Study. *American Journal of Clinical Nutrition*, 69(2), 308–317.
- Institute of Medicine. (2000). *Promoting health: Intervention strategies from social and behavioral research*. Washington, DC: National Academy Press.
- Israel, B. A., Schulz, A. J., Parker, E. A., Becker, A. B., Allen, A. J., & Guzman, J. R. (2003). Critical issues in developing and following community based participatory research principles. In M. Minkler & N. Wallerstein (Eds.), *Community-based participatory research for health*. San Francisco, CA: Jossey-Bass.
- Jacoby, B. (1996). *Service-learning in higher education: concepts and practices*. San Francisco, CA: Jossey-Bass.
- Jones, K. L. (1998). Non-insulin dependent diabetes in children and adolescents: The therapeutic challenge. *Clinical Pediatrics*, 37(2), 103–110.
- Matteson, P. S. (Ed.) (2000). *Community-based nursing education*. New York: Springer Publishing.
- McLeroy, K. R., Norton, B. L., Kegler, M. C., Burdine, J. N., & Sumaya, C. V. (2003). Community-based interventions. *American Journal of Public Health*, 93(4), 529–533.
- Meininger, J. C. (1997). Primary prevention of cardiovascular disease risk factors: Review and implications for population-based practice. *Advanced Practice Nursing Quarterly*, 3(2), 70–79.
- Meininger, J. C. (2000). School-based interventions for primary prevention of cardiovascular disease: Evidence of effects for minority populations. *Annual Review of Nursing Research*, 18, 219–244.
- National High Blood Pressure Education Program Working Group on Hypertension Control in Children and Adolescents. (1996). Update on the 1987 Task Force Report on High Blood Pressure in Children and Adolescents. A Working Group Report from the National High Blood Pressure Education Program. *Pediatrics*, 98(4, Part 1), 649–658.
- Pickering, T. G. (2002). Principles and techniques of blood pressure measurement. *Cardiology Clinics*, 20(2), 207–223.

- Poirrier, G. (2001). *Service learning: Curricular applications in nursing*. Boston, MA: Jones & Barlett Publishers.
- Sorof, J. M., Poffenbarger, R., Franco, K., Bernard, L., & Portman, R. J. (2002). Isolated systolic hypertension, obesity, and hyperkinetic hemodynamic states in children. *Journal of Pediatrics*, 140(6), 660-666.
- Strauss, R. S., & Pollack, H. A. (2001). Epidemic increase in childhood overweight, 1986-1998. *Journal of the American Medical Association*, 286(22), 2845-2848.
- Stuart, C. A., Gilkison, C. R., Smith, M. M., Bosma, A. M., Keenan, B. S., & Nagamani, M. (1998). Acanthosis nigricans as a risk factor for non-insulin dependent diabetes mellitus. *Clinical Pediatrics*, 37(2), 73-79.
- Stuart, C. A., Pate, C. J., & Peters, E. J. (1989). Prevalence of acanthosis nigricans in an unselected population. *American Journal of Medicine*, 87(3), 269-272.
- U.S. Department of Health and Human Services. (n.d.). *National Institutes of Health*. Retrieved April 7, 2003, from <http://www.nih.gov>.