LATEX SENSITIVITY EDUCATION BY ADVANCED PRACTICE NURSES IN PRIMARY CARE

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ABSTRACT

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Between 1988 and 1992, the FDA received reports of more than 1100 allergic or anaphylactic reactions and 15 deaths related to the use of latex-containing medical devices and products (Kellett, 1997). Once a person is sensitized to latex, it takes minimal exposure to set off an allergic reaction. An advanced practice nurse (APN) can expect to encounter patients at risk for latex sensitivity, and by using various roles of the APN, a nurse practitioner can impact patients and their families.

The purpose of this project is to develop an educational pamphlet that will increase patient awareness of the prevalence and risk of latex allergy and minimize latex crisis. The conceptual framework used for the project is Pender's Health Promotion Model, a paradigm well known in nursing for health promotion.

The ease of use and clinical utility for the nurse practitioner is an asset of this project. A limitation is the lack of pre or post testing to determine validity. An inclusive, research based pamphlet would be of great assistance to APNs and their clients.

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I would like to dedicate my scholarly project to Thomas, my husband, and Thomas and Jeremy, our children, who understood and encouraged my efforts. And for Mollie, for her patience and support along the way.

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CHAPTER I

Overview

On March 29, 1991, the Food and Drug Administration (FDA) issued a Medical Alert regarding allergic reactions to latex-containing medical devices (Jackson, 1995). Health care professionals were advised to identify their latex-sensitive patients and prepare to treat allergic reactions promptly (Gelb, 1991). Through early 1996, the FDA reported more than 1,600 allergic or anaphylactic reactions and 23 patient deaths (Jackson, 1995).

In 1927, the first report of latex allergy appeared in German literature (Grimm, 1927). In 1979 the first English language report appeared (Nutter, 1979). Between 1988 and 1992, the FDA received reports of more than 1,100 allergic or anaphylactic reactions and 15 deaths related to the use of latex-containing medical devices and products (Kellett, 1997). The literature since 1979 includes numerous studies and case reports documenting hypersensitivity to latex. Barnett, Keller, and Murray (1997) give three case reports about how increased latex contact in the work place has led to disability secondary to anaphylactic reaction. Once a person is hypersensitive, it takes minimal exposure to set off an allergic reaction (Murray, 1997). Serious anaphylactic reactions have occurred in many different in-patient, out-patient, and even social settings including

vaginal deliveries, examinations, dental procedures, donning gloves, and blowing up balloons (Gold & Sussman, 1997).

There are several theories that explain the recent increase in prevalence of latex allergy. The most plausible is the introduction of universal precautions in an effort to prevent the spread of hepatitis B and HIV infections (Centers for Disease Control, 1987). With universal precautions, a single standard of blood and body fluid precautions must be used with all patients at all times as it is assumed that these fluids could be potentially infected. One of the main ways to comply with universal precautions is through glove use (Gold & Sussman, 1997). Gold and Sussman state that the growing industry for latex glove production has resulted in greater exposure of health care workers and patients to latex products.

Increased demand for latex gloves created changes in glove processing and manufacturing, including shorter wash and shelf times, which have increased the amount of latex protein antigens in gloves and other products (Levy, Charpin, & Pecquet, 1992). Another possible reason for the increased prevalence relates to greater awareness of latex allergy and the corresponding increased recognition and reporting (Kelly, Kurup, Reijula, & Fink, 1994).

The advanced practice nurse (APN) has a major role in health promotion and disease prevention (Snyder & Mirr, 1995). With the growing number of people affected by latex allergies, it is clear that an APN in family practice can

expect to encounter patients who either have symptoms of latex sensitivity or are at significant risk. By using the various roles of the APN, such as clinician, counselor, assessor, change agent, and educator, a nurse practitioner in primary care has the opportunity to impact patients and their families.

Prevention can be categorized as primary prevention or secondary prevention. In the case of latex sensitivity, primary prevention concerns increasing patient knowledge of risk factors that, if left unchecked, could lead to sensitivity due to continuing exposure. Secondary prevention is aimed at decreasing latex crisis in patients who already have latex allergies. Barnett, Keller, and Murray (1997) give three case reports about how increased latex contact led to disability secondary to anaphylactic reaction.

The purpose of this project is to develop an educational pamphlet that will increase patient awareness of latex allergy and decrease the risk of latex allergic response. The pamphlet will focus on patients preventing occurrences of crises by decreasing repetitive and sensitizing exposure. This project is literature based. However, projected means of evaluating the outcome of this project would be research based and will be discussed in greater depth in Chapter 5. On a more global scale, increased awareness of latex sensitivity can reduce hospital admissions and emergency treatment, reduce absenteeism by

reducing repeated latex exposure. Jackson (1995) believes that because latex allergy is occupationally acquired, APNs have a dual responsibility to protect patients. If APNs take up the challenge of educating patients about latex allergy and advocating for a latex-free environment, this may prevent life-threatening situations (Strzyzewski, 1995).

The conceptual framework for this project is the Health Promotion Model (HPM). Developed by Nola J. Pender, the framework offers a guide for exploration of biopsychosocial processes that motivate individuals to engage in behaviors directed toward amplifying health (Pender, 1996). Well known in nursing as a paradigm for health promotion, the HPM has been used in a number of studies addressing enhanced medication compliance (Lannon, 1997), the role of self-care at home (Bohny, 1997), strategies for promoting a healthy diet (Herron, 1991), and strategies for promoting health protection (Bigbee & Jansa, 1991). The HPM proposes that there are elements which are divided into cognitive-perceptual factors, modifying factors, and variables affecting likelihood of actions.

The HPM is an appropriate framework for interventions by the APN toward prevention of anaphylaxis. A nurse practitioner could impact the outcome by increasing a patient's knowledge about prevention and treatment, by acting as a cue to take action, or by addressing modifying factors or barriers to effective latex prevention. By educating patient about their personal susceptibility and

risk factors, the APN can increase patients' understanding of the need for lifestyle changes. A supportive and caring APN who is continually encouraging and assessing patients and their families can serve as a vital cue to action and can help patients develop skills needed to make alternative choices to latex. The APN can promote a learning atmosphere to include appropriate avoidance and treatment measures when indicated to promote better living without latex. Goals and treatment plans if a latex crisis evolves can be developed. An APN, using the HPM as a conceptual framework, can be of great use to patients interested in improving their health.

CHAPTER II

Review of Literature

The body of literature documenting risk factors for latex sensitivity is significant and there is consensus among researchers that an individual can greatly reduce his or her risks by avoidance. Reis (1994) suggests the most obvious prevention method is avoiding all rubber and elastic products. However, often there are no alternative products to those containing latex. In addition, many of the products used are not labeled to identify latex content.

Sensitization

What is known is that severe allergic reactions can occur after the most minute amount of particles have been introduced cutaneously, mucosally, or parenterally. Sensitization to latex is thought to be the process responsible for systemic reactions. During the process of sensitization, the first time the allergen is introduced to the system no symptoms may occur. However, the immune system prepares to react immediately to the substance the next time the body comes into contact with the allergen (Jackson, 1995). Due to the process of sensitization, many individuals are fooled into thinking that the slight rash on their hands under latex gloves or the rash under the elastic of underwear is harmless. However, this rash may be a precursor or early warning sign of latex allergy.

Through the process of sensitization, latex allergy becomes a dynamic progression (Strzyzewski, 1995). Many published reports (Jackson, 1995; AACN, 1995) document cases of patients and health care workers who initially experienced only contact dermatitis when exposed to latex-containing products. After continual, repetitive contact with latex they developed an anaphylactic reaction. There have been several documented cases of nurses who were forced to leave the health care profession because they experienced shortness of breath and wheezing when they walked into a room containing latex gloves (Adkins, 1997; Kellner, 1997; Barnett, 1997; Murray, 1997).

The literature demonstrates that the evolution of this allergy is becoming more widespread. In 1987 when the Centers for Disease Control and Prevention recommended latex glove use as a part of universal precautions in the prevention of bloodborne pathogen transmission, reports of localized reactions to latex-containing products increased dramatically (Zaza, Reeder, Charles, & Jarvis, 1994). As of 1994, 402 adult patients have had allergic reactions to the latex tipped catheter used to administer barium enemas. Of those 402 patients, at least 15 died as a result of the allergic reaction (Zaza et al., 1994).

Once sensitized to latex, an individual can progress to develop a more serious allergic reaction. This type of reaction occurs within minutes to hours of exposure and is

characterized by urticaria, dyspnea, angioedema, bronchospasms, hypotension, and cardiac arrest.

Occupational Risk Factor

An article published in 1992 quotes the chairman of the FDA's Latex Sensitivity Group as estimating that 6% to 14% of all health care workers are latex sensitive or allergic (American Health Consultants, 1992). According to Beezhold and Sussman (1997) latex sensitivity is the development of immunological memory to latex antigens after exposure. Subsequent use of antigen-containing materials can increase sensitivity to the point of allergic reaction. By 1994, 21% of 1,738 nurses surveyed by the Association of Operating Room Nurses (AORN) reported having had a latex reaction (Zaza et al., 1994). Currently, experts estimate that at least 1 in 10 American health care workers has an allergy to latex (Strzyzewski, 1995).

Although the literature clearly supports the premise that latex allergy is an occupationally acquired health hazard, workers' compensation is frequently denied to those people who are forced by the allergy to leave the health care arena (Groce, 1996). In general, however, the literature lacks a simple, specific, clinically focused pamphlet describing risks of latex for the family practice patient. Legal precedent has yet to be established that would force an institution to provide disability or workers' compensation to severely allergic employees when they are no longer able to work (Jackson, 1995).

General Public

Leaving the individual's profession isn't always the complete answer to the problem. Jackson (1995) estimated that latex is currently present in more than 40,000 medical, dental, and consumer products. This pamphlet will provide a list of some consumer products containing latex. Allergic reactions commonly occur in the dental office due to use of equipment made from latex that is placed directly in contact with mucous membranes of the mouth (Strzyzewski, 1995; Heese, Peters & Koch, 1997). Reis (1994) gives examples of further home exposure through wearing household cleaning gloves, using latex condoms, blowing up balloons, and handling sports equipment, especially tennis racket handles. Groce (1996) discussed latex being found in finished cotton, nylon and lycra spandex products. Natural rubber latex has been used since the 1920s as the central core for other fibers. Elastic yarns are made with a core of either natural rubber fibers or lycra spandex with cotton wrapped around it. Rubber yarns are used in foundation garments, swimwear, surgical fabrics, elastic bandages, support hose, underwear, shoe fabrics, and the tops of socks and hosiery (Groce, 1996). Groce further explains waistbands are the most likely place to find latex thread. Sewn-in waistbands are more likely to contain latex threads than knitted-in waistbands. Current Federal Trade Commission rules say that a manufacturer does not have to list components of a garment if the ingredient comprises less than 5% of the total.

Mitchell (1999) points out that 5% is a considerable amount if the material is an allergen.

Latex allergic patients who experience a reaction around streets that are being paved or roofs being repaired do so for a reason. According to Groce (1996), asphalt, when combined with ground up tires in the paving process, contains natural rubber. The latex sufferer also needs to be aware of the natural rubber found in both passenger car tires and commercial vehicle tires. Latex allergens have been documented in tire dust, roadside dust, and air samples from the Los Angeles area (Groce, 1996).

Protocols

Kerr (1999) and Seibel (1999) document a proactive approach taken by some hospitals that recognize the seriousness of allergies. These institutions have a no latex balloon policy in an attempt to reduce exposure to patients and staff members. Kerr (1999) further documents that Shriners Hospital for Children in Springfield, Illinois, take this a step further and send all donations of toys or sports equipment through a test to determine latex contents.

Avoidance could lengthen the patients quality of life at home and in the workplace. The APN needs to become familiar with products containing latex at work and at home to educate patients (Strzyzewski, 1995). The APN needs to be vigilant in educating patients of latex-containing products. Adkins (1997), Coulombe (1998), and Stein,

Badger, & Pavesi (1995) offer as a guideline to individuals, families, and professionals a list of latex-containing foods and products. Because the information in this area is continually changing, the APN needs to research updates continuously.

Most literature and research has focused on the history, clinical, and patient care aspects of latex allergy among health care providers. Guidelines and standards for providing care to patients in the family practice setting are lacking. McCormick, Cameron, and Biel (1995) describe how guidelines and standards for providing care to patients with latex allergies has largely been left to the occupational health professional. McCormick et al. (1995), Coulombe (1998), and Jezierski (1997) give examples of established standardized protocols for treating known latex-sensitive individuals and identifying those who are at high risk. Because the effects of this allergy can be so devastating, APNs have a major role in collaborating and educating their colleagues. APNs possess a unique body of knowledge and come in contact everyday with people who may not even be aware of the hazards of latex allergy (Strzyzewski, 1995).

Food Exposure

Though several latex crossreactive allergens have been identified, food allergens most notably banana, avocado, kiwi, chestnut, and soybean have been the most documented (Zweiman, 1998). Delbourg, Guilloux, Vautrin, and Ville

(1996) studied the relationship between banana hypersensitivity and latex allergy in a population of 19 latex-allergic patients. Eight of 16 patients (50%) reported symptoms after eating bananas, and banana skin prick tests were positive in 5 of 14 patients (63%). They further explained that in immunoblot experiments, 17 of the 19 patients (89%) exhibited specific banana IgE antibodies and 16 allergenic components were identified. This study helps to confirm the latex-tropical fruit correlation.

Testing

Post, Jennett, Zaglaniczny, Oesterle, Lebenbom-Mansour, and Jarrett (1996) did a prospective study evaluating the prevalence of IgE antibodies to latex and the value of a high-risk history in predicting the presence of IgE antibodies to latex. Questionnaire responses and serum levels of IgE antibodies against latex proteins (ALASTA) from 996 patients showed that history alone was not a reliable predictor of latex allergy.

Heese, Peters, and Koch (1997) did a longitudinal study, which included 81 members of a nursing school evaluated prior to beginning training. Some had already worked in a hospital for some months. A total of 8.6% of these 81 volunteers had a positive prick test to latex extracts. Recommendations from this study were to perform a latex allergy evaluation prior to entry or employment in the medical profession to minimize risks. Zweiman (1998) states the diagnosis of latex allergy is frequently not easy, but

newer skin test and in-vitro blood testing may help. According to Young & Meyers (1997), to date, the FDA has not approved a standardized latex extract in the United States for the skin prick test. Allergists must prepare their own allergen by using extractions from latex gloves or raw latex sap. Although this method is highly sensitive (90% to 95%), some researchers have reported up to a 2% incidence of anaphylaxis with these tests (Keller, 1997). Both the intradermal and skin prick tests carry the possibility of eliciting a systemic allergic reaction, or even anaphylaxis, to the latex allergen (Young & Meyers, 1997). Precautions should be taken before performing these tests, and emergency medication and resuscitation equipment should be available. The APN needs to weigh the importance of obtaining a diagnosis to latex allergy through definitive testing against the risk of conducting the test. Obtaining an accurate clinical history may be the safer route to determine latex sensitivity (Young & Meyers, 1997).

Radioallergosorbent testing has been used to measure the serum level of latex-specific IgE (Kellett, 1997). Estimates of the sensitivity of this method range from 50% to 95% (Turjanmaa & Reunala, 1988; Young & Meyers, 1997). The test uses a two-phase system with an insoluble allergen. The allergen is first incubated in a sample of patient's serum to react with allergen-specific antibodies and is followed by an incubation with radio-labeled heterologous antihuman IgE to detect the allergen-specific antibodies of

the IgE isotype (Gleitch & Yunginger, 1981). Sensitivity and specificity of the radioallergosorbent test depends on the population being tested (Weido & Sim, 1995). According to Kellett (1997), it is important to realize that the level of reaction does not always equate with the level of IgE. Patients who have had negative test results have had serious reactions.

The literature does a adequate job of describing of how to manage latex-sensitive individuals once sensitivity or allergy has been determined. It is lacking, however, in providing practitioners with diagnostic testing or the tools or devices to help with teaching patients how to minimize risk.

CHAPTER III

Conceptual Framework

Theories and models are useful in their ability to provide guidance and direction for research and practice. A useful theory should provide a researcher with important variables that can be examined in relation to phenomena of interest. Thus far, no single theory or model has captured all potential variables related to nursing education.

The Health Promotion Model (HPM) was derived from social learning theory to explain individuals' behavior in regard to promoting health (see Figure 1). Health as defined by Webster (1988) is "state of fitness of the body or of the mind" (p.446). According to Pender, "Health is the actualization of inherent and acquired human potential through goal-directed behavior, competent self-care, and satisfying relationships with others while adjustments are made as needed to maintain structural integrity and harmony with relevant environments" (Pender, 1996, p.22). Health for the latex-sensitive individual is self-care and control of environmental factors. The more often a latex-sensitive person comes into contact with the allergen, the more sensitive they may become. This increases the individual's sensitivity with a higher likelihood of developing a life-threatening anaphylactic reaction.

The HPM is utilized for this project because it has been used as the theoretical basis for studying the impact

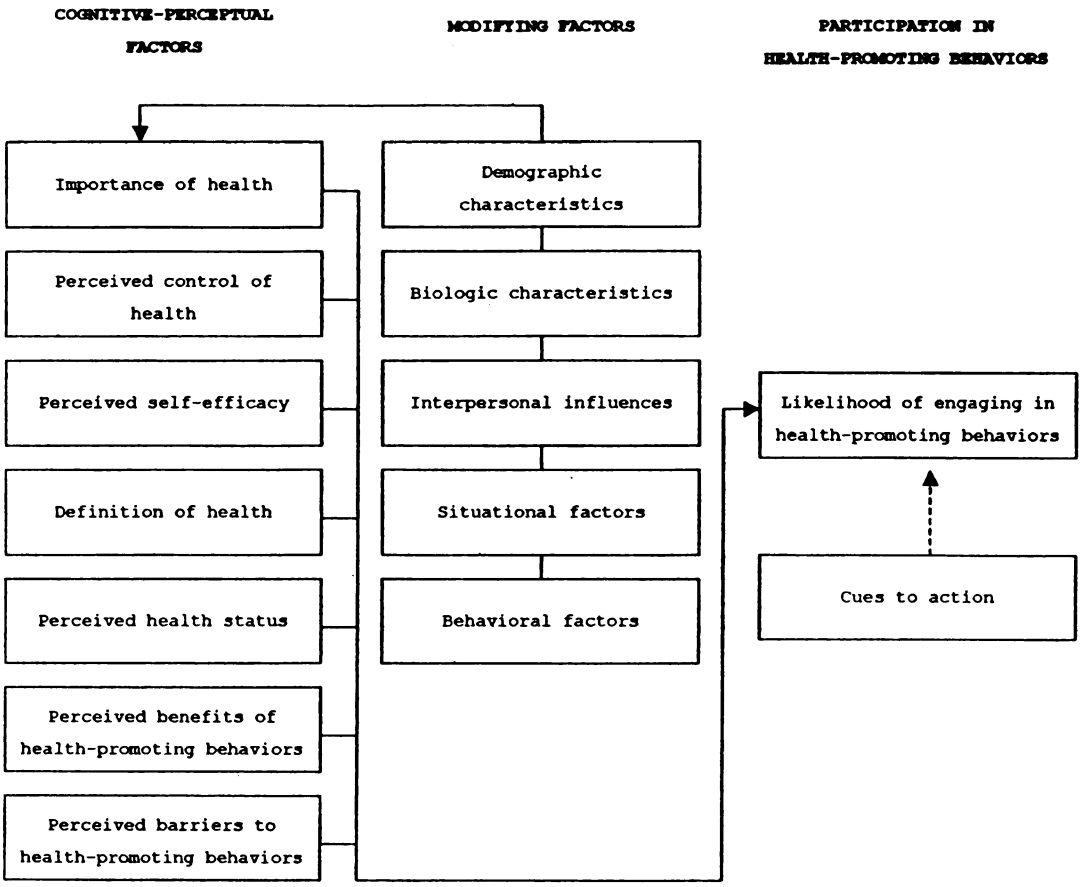

Figure 1.

Health Promotion Model (Pender, 1987).

of health education. Opatz (1985) defines health promotion as "systematic efforts by an organization to enhance the wellness of its members through education, behavior changes, and cultural support" (p.7). Pender (1996) defined health promoting behavior as "directed toward increasing the level of well-being and self-actualization" (p.53). Pender further defines the HPM as "an attempt to depict the multidimensional nature of persons interacting with their environment as they pursue health" (p.53).

This model has potential application across the life span from pediatric to geriatric nursing. The usefulness of the HPM lies in the ability to examine the individual's level of well-being, self-actualization, and personal fulfillment.

Pender (1987) has categorized health promoting behavior into cognitive-perceptual factors, modifying factors, and variables affecting likelihood of actions. Cognitive-perceptual factors include importance of health, perceived control of health, perceived self-efficacy, definition of health, perceived health status, and perceived benefits and perceived barriers to health-promoting behaviors. Modifying factors (including demographics, biological characteristics, interpersonal influences, situational factors, and behavioral factors) are proposed to have a causal influence on the cognitive-perceptual factors, which represent the primary motivational factors of health-promoting behaviors.

Pender (1987) discusses how health education is an intervention capable of sustaining behavioral change. Hamric and Spross (1989) describe primary care "as a mode of practice delivered in ambulatory settings and that the concept of primary care be coordinated, comprehensive care delivered throughout a course of illness, inclusion of health promotion as well as illness treatment, and the emphasis on education" (p.383). Health education about latex-sensitivity by primary-care providers can protect patients from future difficulties. Primary-care providers can take action to help patients reduce their risk of latex sensitivity. This relates to Pender's perceived control of health risk. These actions can benefit not only individuals' health but also affect employment opportunities and families.

Pender viewed environment, situational, and interpersonal factors as modifiers of the central cognitive-perceptual factors. King (1994) suggests Pender viewed the environment as it relates to behavior rather than how it relates to health. People who value health tend to seek information about health-related issues (Pender, 1987). In the case of people with latex sensitivity, education is critical if the person is going prevent a latex crisis. Although education about medical treatment is initiated at the time of diagnosis, it needs constant reinforcement in order to produce maximum health results. Each interaction with the patient provides an opportunity to review patients'

knowledge about latex sensitivity and to assess their motivation regarding prevention (Bandura, 1977).

As is applies to latex sensitivity, Pender's health promotion model must be adapted. The relevant cognitive-perceptual factors include definition of health, perceived benefits of health-promoting behaviors, and perceived barriers to health-promoting behaviors. Modifying factors as applied to latex sensitivity include household exposures, occupational exposures, foods to avoid, and protective measures (see Figure 2).

Pender gave little recognition to the impact that the society standing has on the individual. Rather, she focused on individuals, their perception of control, definition of health, and decision-making capacity. Pender (1987) admitted that the extent to which the HPM can explain lifestyle patterning or specific behaviors remains to be seen. The model neglected to address the behavior of families and communities, which are important influences on individual behavior. Pender's model is further limited as the existence or complexity of interrelationships among factors is not acknowledged. For example, how do interpersonal influences relate to one's definition of health? Is one's age reflected in one's definition of health? Hilton (1986) felt that further clarification was needed in the area of self-esteem and questioned, "do attitudes precede behavioral changes, or vice versa?" (p.61).

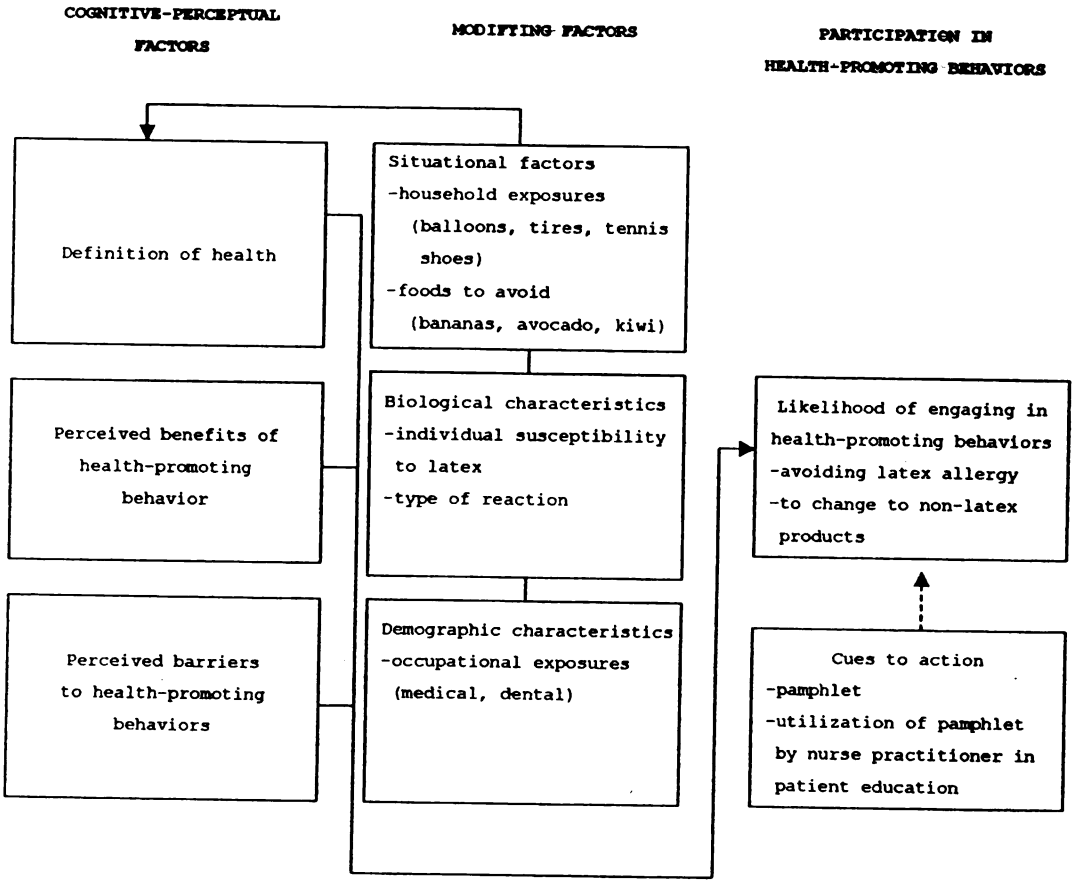

Figure 2.

Modified Health Promotion Model (Wodarek, 2000)

According to Green and Raeburn (1990), health promotion models must move beyond assessment of health and health programs, toward implementation of these programs. The individual and global environment context should be considered to be of equal account.

According to the HPM, once people decide to engage in preventive behavior, a cue is needed to motivate them into action. Cues may be internal, such as the perception of a symptom, or external, such as an advertisement or pamphlet. Pender contends that the intensity of the cue must match the level of readiness of the patient. For example, a patient with a low level of readiness needs a high-intensity cue to act (Pender, 1975).

Changes are required and change is rarely easy. Advanced practice nurse will be assisted in developing their empowering and health promoting skills with this pamphlet. A sound theoretical base of knowledge will be essential as APNs link theory to the practical tasks of assessment, planning, implementation, and evaluation. The APN must examine what health promotion has to offer the patient as well as what the APN can offer health promotion.

CHAPTER IV

Project Development

Latex sensitivity is a challenging new disease process that requires health care professionals to become more knowledgeable to ensure provision of safe quality care and to recognize their own risks. Most literature and research has focused on the history, clinical, and patient care aspects of latex allergy. Little has been written about the education teaching material available for the primary care patient. A latex allergy pamphlet was developed with the intention for anyone involved in the education of patients' to be aware of the prevalence of latex sensitivity.

This pamphlet will give the primary care patient a greater understanding to latex allergy and will assist them in formulating plans of action to provide safe quality care. It will also be an interactive educational pamphlet promoting transference of the learning back to the actual primary care work environment. Areas of focus will include identification of latex, reactions, foods to avoid, products, to protection methods, and resources. It lacks a comprehensive knowledge base but will assist the patient into further research. It is hoped the pamphlet will assist the patient in formulating an action plan to alternative products and help to ensure a quality safe environment.

The pamphlet is at the fifth grade reading level, which is appropriate for most healthcare material intended for the

public. Even this will be too difficult for many adult Americans (Doak, 1996). A need clearly exists to match materials to the needs of those with more limited literacy skills. Le Welling (1992) felt the single most problem is installation of a language that is a national language related to vocabulary expansion, spelling or grammar standardization to cover a sufficiently large majority of the citizens. This pamphlet is written in English but could be translated into other languages.

Project

In 1927 the first report of latex allergy appeared in German literature (Grimm, 1927). In 1979 the first English language report appeared (Nutter, 1979). Between 1988 and 1992, the FDA received more than 1100 reports of allergic or anaphylactic reactions and 15 deaths related to the use of latex-containing medical devices and products (Kellett, 1997). The literature since 1979 includes numerous studies and case reports documenting hypersensitivity to latex. Barnett, Keller, and Murray (1997) give three case reports about how increased latex contact in the work place has led to disability secondary to anaphylactic reaction. Once a person is hypersensitive, it takes minimal exposure to set off an allergic reaction (Murray, 1997). Serious anaphylactic reactions have occurred in many different in-patient, out-patient, and even social settings including vaginal deliveries, and examinations, dental procedures,

donning gloves, and blowing up balloons (Gold & Sussman, 1997).

Latex

Natural latex is the white milky sap harvested from the rubber tree *hevea brasiliensis*. The tree is grooved and the sap then drains into collection cups placed at the end of the grooves. Preservatives such as ammonia and sulfites are added immediately to prevent auto coagulation of the sap. During the conversion of liquid natural rubber latex into the finished product, many accelerators, antioxidants, emulsifiers, stabilizers, extenders, colorants, retarders, stiffeners, ultraviolet light absorbers and fragrances are added (Jackson, 1995). After processing, the product contains 2% to 3% latex protein. It has not yet been determined whether the latex or *hevea* proteins, the chemicals used in the manufacturing process, or the combination of the two cause the allergic reaction (Jackson, 1995). Natural rubber latex should not be confused with butyl- or petroleum based synthetic rubbers. Synthetic products, including latex house paints, have not been shown to pose any hazard to latex sensitive individuals (Mitchell, 1999).

Reactions

There are three types of reactions to latex products. The first is the chemical irritation dermatitis, the second is type IV contact dermatitis, and the third type is the type I immediate reaction (Kellett, 1997).

Chemical irritant reactions are the most common adverse reactions associated with exposure to latex products. They are caused by chemicals such as theorems used in manufacturing. These reactions are especially prevalent among individuals who wear latex gloves continually at work. They usually cause a mild chemical dermatitis, which occurs in 25% to 40% of regular glove wearers. Irritant reactions do not involve the immune system, but they may be important cofactors in the development of immunologic reactions to latex (Kateraris, 1996).

Type IV reactions are somewhat minor delayed local allergic reactions that are caused by chemicals added to the latex during its manufacturing. Type IV dermatitis, although caused by the same chemicals as the irritant reaction, is a true allergic reaction involving the immune system, but it is localized to the skin or mucous membrane (Kellett, 1997). This is a delayed, hypersensitive, cutaneous reaction to the rubber additives mercaptobenzothizole and tetramethyithiuram (Bensky, 1995).

Type I allergic reaction are the antigen antibody reactions mediated by the IgE mast cell system. These are immediate reactions that can occur within minutes or one to two hours after exposure. Immediate allergic reactions to latex happen when latex proteins enter the body through the skin, respiratory tract, or mucosal or serosal membranes (Sussman, Tarlo, & Dolovich, 1991). Tarlo, Wang, and Ross (1990) suggest in their data that the respiratory tract is a

very significant route of sensitization. This finding is particularly important to the individual who often works in environments with high levels of airborne latex because of frequent repetitive exposure to latex.

Signs and Symptoms

Chemical irritants cause non-allergic skin rash characterized by hand erythema, dryness, cracking, scaling, and vesicle formation (Fay, 1991).

The contact dermatitis that occurs with type IV delayed reactions presents with pruritus, edema, erythema, vesiculation, crusting, thickening of skin (Jackson, 1995). This itchy, red, mildly swollen rash first appears only on areas of the skin which actually touched the latex but then spreads beyond the contact area. These symptoms typically emerge 10 to 30 hours after contact.

Signs and symptoms of a type I hypersensitivity reaction include generalized urticaria, wheezing, dyspnea, laryngeal edema, bronchospasm, tachycardia, angioedema, hypotension, and cardiac arrest (Jackson, 1995). Symptoms typically occur within minutes of exposure. In rare cases, anaphylaxis may result (Sussman & Beezhold, 1995).

Risk Groups

Generally, anyone who encounters significant exposure to latex has the potential for developing a latex allergy. Fisher and Sawins (1998) identify individuals with chronic urologic conditions, patients with a history of multiple surgeries, and atopic individuals in the high risk groups.

Many occupations are at particularly high risk for the development of latex allergy. These include hairdressers, greenhouse workers, food preparation personnel, housekeeping staff, rubber manufacturer employees, homemakers, day care workers, and dairy workers (Groce, 1996).

Mormann (1996) identifies children and adults afflicted with spina bifida as being the highest risk group. These patients become sensitized because of extensive exposure to latex when undergoing multiple surgeries and catheterizations along with repeated contact with medical personnel wearing latex gloves (Fink, 1995). Health care workers experience the second highest incidence (Mormann, 1996).

Risk taking behaviors put average adolescents at high risk. Daily exposure to latex containing items such as school supplies (rubber bands, erasers, gym floors, and fast food consumption (food handled with latex gloves), and athletic supplies (sneaker soles, elastic on socks, handles of racquets) can lead to sensitization in the currently nonallergic individual (Fisher & Sawin, 1998). Unfortunately the active adolescent has a difficult task avoiding latex containing products. Further careful discussion of contraceptive methods must be initiated for the sexually active teen.

A further risk factor has been documented in individuals with a history of food allergies to tropical fruits, hazelnuts, chestnuts, or peaches, particularly if

symptoms escalate inseverity. Chen, Posch, Cremer, Raulf-Heimsoth and Baur (1998) "hevein is the major cross-reacting allergen with avocado in subjects with latex allergy" (p.476). Health care workers with a history of atopy (asthma, hayfever) or who have food allergies particularly to bananas, avocado, chestnuts, and kiwi fruit are at risk for sensitization to latex (McCormack, Cameron & Biel).

Latex Products

There are thousands of medical products that contain latex. It is a difficult task to identify them, because many products are not labeled with their contents, so it may be necessary to contact each manufacturer for written information.

Latex is a common component of many medical supplies, including disposable gloves, airway and intravenous tubing, syringes, stethoscopes, catheters, dressings and bandages. Latex also is found in as many as 40,000 consumer products, including condoms, balloons, athletic shoe soles, tires, underwear leg and waist bands, rubber toys, nipples and pacifiers (Mitchell, 1999). In the United States, recycled or reclaimed rubber has been used to reinforce asphalt since the early 1960s. The reclaimed rubber is formed from ground whole tire rubber and ground tire tread. These tire components contain natural rubber. More further, latex allergens have been found in tire dust, roadside dust, and air samples from the Los Angeles area (Groce, 1996). Several hospitals across the country are no longer

permitting latex balloon to be brought in as gifts for patients. Kerr (1999) reports Shriners' Hospital for Children is latex free and even donations of toys or sports equipment must pass the latex free test.

Recommendations to the Latex Sensitive Patient

Although there is no treatment for the latex allergy, patients can reduce their risk of reaction by avoiding direct contact with latex. They should take steps to find out which products in their environments contain latex and the substitutes that can be used for those products. It is also important to avoid breathing in latex particles from powdered gloves.

Latex-allergic individuals should always wear a Medic-Alert bracelet or necklace and talk to their health-care providers and dentists about their allergies. Other precautions include a prescription for an epinephrine self-injection pen to use in case of a serious reaction. They may even wish to carry non-latex gloves with them at all times for use by emergency personnel if they need medical attention. Researching area hospitals to determine their latex allergy policies is another suggestion. Jackson (1995) believes many companies are becoming knowledgeable about latex sensitivities and are beginning to identify their products that contain latex. Part of the APNs responsibility is to become educated and educate others by joining resource groups, support groups, and government legislation to support non-latex alternatives.

Resources

The World Wide Web contains numerous sites dealing with information about latex allergy, with new material continually being added. Below are just some examples:

Latex Allergy Links

http://www.netcom.com/~nam1/latex_allergy.html.

Latex Allergy Help

http://www.latexallergyhelp.com

Foundation for Latex Allergy Research and Education

http://www.flare.org

Latex Allergy Home Page

http://allergy.mcg.edu/physicians/ltxhome.html

CHAPTER V

Summary

Latex products are everywhere, and anyone can become allergic to latex. People with the highest risk are those who have had many operations, especially in childhood. People with spina bifida and urologic abnormalities are especially at risk. Latex allergy can be mild, with symptoms such as itchy, red, watery eyes, sneezing or runny nose, coughing, rash or hives. It can also be very severe, with symptoms like chest tightness, shortness of breath, and shock. It may even cause death. A latex-sensitive person can have a life-threatening allergic reaction with no previous warning or symptoms. Some foods may cause an allergic reaction in people who are allergic to latex. The most common of these foods are banana, avocado, chestnut, kiwi and tomato. It is recommended that latex-sensitive individuals avoid only the foods that have given them an allergic reaction to prevent possible nutrition problems.

Although there is no treatment for latex allergy, individuals can reduce their risk of reaction by avoiding direct contact with latex. Taking steps to find out which products in the environment contain latex and the appropriate product substitutes is essential for latex-sensitive individual.

Young and Meyers (1997) emphasize it is possible to create a safe environment for patients who need to avoid

latex. Further research needs to be done in manufacturing regarding extraction of latex protein allergens from products. Patients should be encouraged to use latex-free products. Employers need to develop protocols that employees can use to alter their work environment.

Implications for Practice

With the widespread use of latex containing products within the health care industry, all primary care providers should be advised of this potential problem. The allergy status, including latex allergy, of all patients should be known. Once latex allergy is established, avoidance of latex containing products is important. Since the primary care provider often has the most contact with a given patient, continuing education on latex allergy should be included in each visit (Fisher, 1998). Latex allergy is becoming an enormous problem for the health care industry. Practitioners need to act in a responsible manner to protect patients or millions of other patients may become allergic to the medical products that were designed to save lives (Kellett, 1997).

Advanced practice nurses in family practice see patients on a frequent basis through health promotion and sick visits. Relatively frequent visits provide the APN with opportunities to reinforce cautions and assist with problem solving for finding latex-free alternative products.

For the patient who requires surgery, latex allergy status should be discussed with the surgical team. Eighty

percent of anaphylactic reactions in the pediatric population that occur during surgery are due to latex allergy (Fisher, 1998). Since patients come in contact with a variety of personnel in the office or clinic setting, latex allergy in-service programs and educational pamphlets should be available for all personnel.

APNs in all settings should consider latex allergy in any patient with complaint of allergenic or dermatologic symptoms. Once an latex allergy or a high-risk group patient has been identified, latex precautions should be instituted. Proposed interventions would include the following: latex allergy sign on the chart and latex free toys and activities in the waiting room. Supportive services' including pharmacies, nursing, and dentistry should be informed, and appointments should be scheduled for first thing in the morning, preferably Monday morning, in order to avoid undue exposure to aerosolized latex glove powder. The primary rule is antigen avoidance (Charous, 1994). Latex containing items in the room or on the examination table should be removed whenever possible. Those items that cannot be removed should be covered to prevent possible patient contact. Latex allergy information, including references for alternative products, should be provided. Use of Medic Alert bracelets should be advocated. Household items, including toys that potentially contain latex, should be reviewed with patients and families

so that they can be removed and replaced with nonallergenic items.

In education, strategies to teach health promotion as a nursing role need to be formulated. Practical skills to fulfill the health promotion role and all of its components, such as counseling, educating, and managing, need to be taught from a health promotion perspective. Nurses who graduate with the knowledge that they have a unique skill are in a unique position to help themselves and others attain and maintain the balance and perspective associated with a state of wellness (Fritz, 1984). The advanced practice nurse has a major focus in the role of health promotion and disease prevention (Snyder & Mirr, 1995). This scholarly project focuses on the role of education about latex crisis prevention through latex avoidance.

The Health Promotion Model is an appropriate conceptual framework on which to base patient counseling regarding risks of latex sensitivity. By evaluating patients' potential risks and barriers to change, modifications can be made to reach cues to action. APNs serve as that cue to action. They provide information to affect patients' perceived benefits of health-promoting behaviors and perceived barriers to health-promoting behaviors, which combine to form the likelihood of patients engaging in health-promoting behaviors. Nurse practitioners can also demonstrate the positive impact to patients of adopting

health behaviors, such as avoidance of latex products, by providing a simple useable pamphlet.

The availability of a simple, clinically useful pamphlet that explains threats of latex sensitivity based on modifiable risk factors would be of great benefit to APNs. Further strengths of this pamphlet are its applicability to the general public in primary care and the illustration of the need for more research studies.

A limitation of this project is that the pamphlet has not been pre or post tested to determine validity. There are numerous case study anecdotes but research based pamphlets are lacking.

The major contribution of this project is the support for future research to develop a more inclusive, clinically useful pamphlet that addresses both objective and the subjective state of the patient. The necessary research would first require retrospective studies to determine the most significant risk factors and then a long-term prospective study to evaluate whether interventions to reduce risk factors would result in less exposure sensitivity. Future research could be both quantitative and address incidence of latex sensitivity or it could be qualitative and measure severity of latex sensitivity. Advanced practice nurses have a role in research and could be instrumental in such studies.

A pamphlet that meets the criteria of inclusiveness and clinical utility would be of great assistance to APNs and

could play a role in helping clients to reduce their risk of developing latex sensitivity.

Effectiveness of the pamphlet could be demonstrated by designing a simple questionnaire that assesses patients' knowledge of latex sensitivity and its dangers. The questionnaire could be administered to two groups of patients controlled for demographic characteristics such as socioeconomic status, education, and occupation. The questionnaire would serve as a pre-test for one group which would then read the pamphlet. The same questionnaire could then be administered to this group and would serve as a post-test to measure patients' increased knowledge as a result of the pamphlet.

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APPENDIX A
LATEX SENSITIVITY PAMPHLET

Latex Products

Home

- Condoms
- Balloons
- Athletic shoe soles
- Tires
- Underwear leg and waist band
- Rubber toys
- Nipples
- Pacifiers
- Asphalt
- Erasers
- Telephone receiver cords

Health Care Supplies

- Gloves
- Airway tubing
- Intravenous tubing
- Syringes
- Stethoscopes
- Catheters
- Dressings
- Ace bandages

What to do to protect yourself

1. Avoid direct contact with latex.
2. Substitute non-latex containing products for those that contain latex.
3. Wear a medic-alert bracelet or necklace.
4. Obtain a prescription for an epinephrine self-injection pen with instructions in utilization.
5. Carry non-latex gloves with you to be used by emergency medical personnel and your dentist.
6. Research your area hospitals latex allergy policy.
7. Become involved in a local, state and national latex support groups.

Resources

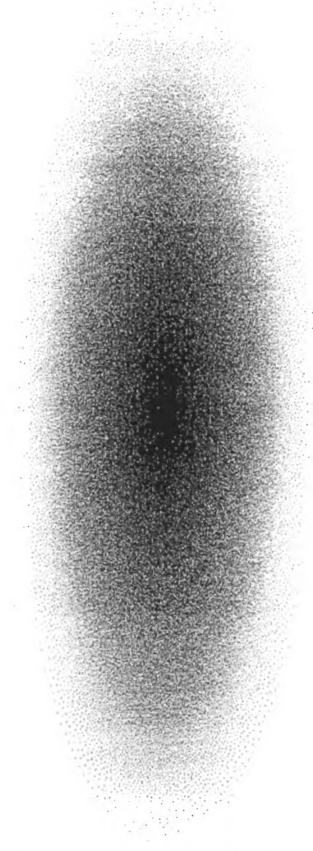
Latex Allergy Links
http://www.netcom-com/~nam l/latex_allergy.html.

Latex Allergy Help
http://www.Latex allergy help.com

Foundation for Latex Allergy Research and Education
http://www.flare.org

Debra A. Wodarek

LATEX SENSITIVITY



How to Reduce Your Risk

Latex

Natural latex is the milky sap harvested from the rubber tree *hevea brasilensis*. During the conversion of liquid natural latex into the finished product many other substances are added. After processing, the product contains 2-3% latex protein.

Rubber made with latex is very popular because of its strength, flexibility, tear resistance and elasticity. Thousands of common household items contain natural rubber latex from shoes to pacifiers to underwear. Because it is also an effective barrier against bacteria and viruses, latex is routinely used in products such as surgical gloves and condoms to stop the spread of infectious diseases.

Natural rubber should not be confused with butyl or petroleum based synthetic rubbers. Synthetic products, including latex house paints, have not been shown to pose any hazard to latex-sensitive individuals.

Reactions

For most people who are latex sensitive, there are three types of reactions which vary from less severe to serious.

Irritants are the most common. They cause a mild non-allergic skin rash characterized by:

- Redness
- Dryness
- Cracking
- Scaling
- Blisters

Delayed local allergic reactions are caused by chemicals added to the latex during its manufacturing. Although caused by the same chemicals as the irritant reactions, is a true allergic reaction involving the immune system. Symptoms occur in 10 to 30 hours after contact. The rash is characterized by:

- Crusting
- Redness
- Swelling

Seek the assistance of your primary care provider for the diagnosis and further resources to prevention of a severe reaction.

A severe allergic reaction occurs within minutes to 1 to 2 hours after exposure. It is characterized by:

- Itching
- Shortness
- Swelling of the throat
- Coughing
- Racing heartbeat
- Low blood pressure
- Loss of heartbeat

This is a medical emergency call 911 or your local ambulance service.

Foods to avoid

- Bananas
- Avocado
- Chestnuts
- Kiwi fruit
- Hazel nuts
- Kumquats
- Cherimoya
- Fig
- Mangoes