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PREVENTION OF LOWER URINARY TRACT SYMPTOMS IN GIRLS AND WOMEN: DEVELOPING A CONCEPTUAL FRAMEWORK FOR A PREVENTION RESEARCH AGENDA

Hypothesis / aims of study

This study describes a novel approach to the study of the prevention of lower urinary tract symptoms (LUTS). The goal was to develop a conceptual framework to guide a LUTS prevention research program among girls and women across the life course. Prevention science is the application of scientific methodology to prevent or moderate major human dysfunction before it occurs. It involves the systematic study of potential risk and protective factors for illness and health, as well as the development of prevention interventions that attempt to change selected risk and protective factors. The prevention science paradigm progresses through phases of translational research, spanning from basic research to effectiveness trials of prevention interventions in real world settings. A key strategy in developing a prevention research program is to devise a conceptual framework that can direct the study and analysis of potential risk and protective factors across different levels of biology and the social ecology within which the individual interacts through the life course. Conceptual frameworks can also aid in identifying potential opportunities for prevention intervention. Our aim was to adopt a conceptual framework to assist in the development of a prevention science agenda for LUTS and promotion of bladder health.

Study design, materials and methods

A transdisciplinary research consortium was formed from U.S. experts across a broad range of disciplines including adolescent medicine, pediatrics, geriatrics, female pelvic medicine and reconstructive surgery, preventive medicine, community health science, psychology, nursing, medical sociology, behavioral science, epidemiology, and biostatistics. The consortium developed a conceptual framework of bladder health that was informed by traditional social ecological models of public health, biopsychosocial models of health, Glass and McAtee's Society-Behavior-Biology Nexus, life course perspectives and the World Health Organization's Conceptual Framework for Action on Social Determinants of Health. Methods of conceptual framework development included (1) defining levels of social ecology and biology that are relevant to the preservation of bladder health/prevention of LUTS, (2) generating potential risk and protective factors within different levels of social ecology and biology, (3) prioritizing risk and protective factors for study by the consortium, and (4) developing research themes based on categorized risk and protective factors. In addition, the consortium delineated life course periods that are relevant to the prevention of LUTS in females.

Results

Table 1 shows a sample of potential risk and protective factors for LUTS and bladder health that were identified by the consortium. Factors are organized by levels of social ecology and biology. Over 600 potential risk and protective factors were generated by the consortium; these were condensed into 44 broad categories of factors, from which eight research themes emerged and were prioritized: (1) Toileting environment/access/habits/techniques; (2) Pregnancy and childbirth; (3) Personal physical health/medical conditions; (4) Musculoskeletal function/ pelvic floor health/muscle awareness; (5) Lifestyle behaviors (e.g., fluid intake, hydration management, dietary factors, smoking, sexual behaviors); (6) Stress and mental health; (7) Infections and microbiome; and (8) Hormonal status across the lifespan. Risk and protective factors that may be particularly salient and influential during different periods of the life course were identified. In identifying life course phases, risk factors were noted when they typically begin to be observed within a developmental period. Chronological age was deemed not as relevant as developmental status and events relevant to bladder health.

Table 1. Potential risk and protective factors for LUTS and bladder health organized by level of ecology.

Level of Ecology	Sample Potential Risk Factors	Sample Potential Protective Factors
Society and Community	<p>Discrimination, racism, disenfranchisement</p> <ul style="list-style-type: none"> Lack of health messaging around a healthy bladder and LUTS "Food deserts," which may lead to poor nutritional choices Wide availability of bladder unfriendly foods (spicy, caffeine) at low cost through schools and community stores Limited access to safe restrooms 	<p>Access to health care resources for LUTS</p> <ul style="list-style-type: none"> More women receiving care and talking about LUTS, which drives LUTS knowledge Presence of health education about bladder health/LUTS Lack of stigma/normalization of bodily elimination
Organizations and Institutions	<p>Toileting environment</p> <ul style="list-style-type: none"> Poor proximity to bathrooms/toilets Low degree of control over access to bathrooms/toilets Low safety/cleanliness/maintenance 	<p>Toileting infrastructure</p> <ul style="list-style-type: none"> Infrastructure for women with disabilities Adequate number of stalls Gender neutral bathroom facilities

Level of Ecology	Sample Potential Risk Factors	Sample Potential Protective Factors
Interpersonal Relationships	Peer pressure / potentially negative peer influences <ul style="list-style-type: none"> • Peer pressure to avoid restrooms • Conformity with unhealthy practices of peer group • Fear of being discovered to have a bladder control problem • Concern about appearance/odor 	Peer support / potentially positive peer influences <ul style="list-style-type: none"> • Peers as a source of information related to bladder • Conformity with healthy practices of peer group • Number of people in one's "circle" talking about LUTS
Mind and Behavior	Beliefs about bladder health, LUTS, and toileting <ul style="list-style-type: none"> • Taboos for discussion (may become more acceptable to discuss bladder health/LUTS as people age) 	Developmental Factors / Knowledge about bladder health <ul style="list-style-type: none"> • Toilet trained by age 4 • Knowing healthy bladder practices and habits
Biology and Body	Pregnancy <ul style="list-style-type: none"> • Pregnancy-related LUTS • Effects on pelvic floor, including pelvic organ prolapse • BMI during pregnancy 	Pelvic floor and bladder health <ul style="list-style-type: none"> • Core/pelvic floor strength • Bladder capacity

Interpretation of results

A conceptual framework was developed based on potential risk factors for LUTS and protective factors for bladder health at different developmental periods of the life course in women. This framework incorporated the interaction between social ecology and biologically-based predispositions towards health or disease and the embodiment of societally constructed risk and protective factors.

Concluding message

The consortium's conceptual framework is the foundation for a research agenda to develop and test evidence-based approaches to promote bladder health and prevention of LUTS in girls and women. The consortium's work has potential to promote the health equity and overall well-being of girls and women in diverse communities, as well as population health more broadly.

Disclosures

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