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How well do parents in the United States report heights and weights for children?

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Public health in the new century

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Introduction

Charles-Edward Amory Winslow (1877-1957), an American bacteriologist and public health professional, who in 1915 established the Yale Department of Public Health within the Yale Medical School defined public health as the science and art of preventing disease, prolonging life and promoting health through the organized efforts and informed choices of society, organizations, public and private, communities and individuals.

This department later became the Yale School of Public Health and most medical schools today also have schools of public health covering the areas of health epidemiology, biostatistics, health service issues, environmental, social, behavioral and occupational health.

The focus and goal of public health is to prevent rather than treat a disease, which can be done through surveillance and the promotion of healthy behaviors. and distribution of condoms are examples of public health measures. Many diseases can be prevented through simple, non-medical methods with hand washing to prevent disease as an easy example.

History

Public health aspects can be found from early sources (like the Bible) and for example man recognized early that water can be polluted and spread diseases. The Romans realized that proper diversion of human waste was a must in urban areas and the Chinese developed the practice of variolation following a smallpox epidemic. Vaccination was only much later introduced when Edward Jenner (1749-1823) in 1796 inoculated an eight year old boy with cowpox and this way paved the way for smallpox vaccination.

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John Snow (1813-1858) was another pioneer, who became known for anaesthesia, medical hygiene and the father of epidemiology. He was one of the first to use ether and chloroform, which he administered to Queen Victoria at birth of two of her nine children. He identified the source of the 1854 cholera outbreak in London by talking to local residents and mapping out the spread of the disease. He found the source of the outbreak at the public water pump on Broad Street (now Broadwick Street) and even though his chemical and microscope examination of a sample of the Broad Street pump water was not able to conclusively prove its danger, his studies of the pattern of the disease were convincing enough to persuade the local council to disable the well pump by removing its handle and this way stop the further spreading of the disease. Afterwards Heinrich Hermann Robert Koch (1843-1910), Nobel Prize winner in medicine (1905) for his discovery of tuberculosis and Louis Pasteur (1822-1895) introduced the germ theory and the production of artificial vaccines. They are together with Ferdinand Julius Cohn (1828-1898) seen as the founders of modern microbiology and medical hygiene (1).

Public health in our time

When infectious disease declined during the last century, public health became more focused on chronic illness, prevention and health promotion issues. Population health has broadened the focus of

public health from individual behaviors and risk factors to population issues such as inequality, poverty, education and the social determinants of health.

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It is our hope that this new journal will provide a place for the publication of papers that will show new directions and new research in the field of public health.

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Review Articles

Mental health aspects of chronic illness in adolescence

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Abstract

Adolescence is a period of tremendous growth and represents a time of transition from childhood to adulthood. Youth who do not experience typical development as a result of chronic illness may experience psychological problems. Adolescents with chronic illness versus typically developing adolescents may need a greater degree of support, resources and guidance to ensure that they grow into psychologically healthy adults. Those youth who receive such help have a greater chance of developing the ability to live relatively healthy and productive lives. Youth who do not experience typical development as a result of chronic illness may experience psychological problems.

Keywords: Adolescents, chronic illness, psychological issues.

Introduction

Adolescence is a period of tremendous growth and represents a time of transition from childhood to adulthood (1-8). Youth who do not experience typical development as a result of chronic illness (see table 1) may experience psychological problems (3,5,9-13). They may also need a greater degree of support, resources and guidance to ensure that they grow into psychologically healthy adults as compared to “typically” developing adolescents (10-15). Those youth who receive such help have a greater chance of developing the ability to live relatively healthy and productive lives.

Psychological development

Psychological development deals more specifically with the progressive organization of cognitive, emotional, and social aspects of function (see table 1). The synthesis of physical, biological, hormonal

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factors in the individual with the functional domains produces predictable types of behavioral and personality characteristics in each individual, the expression of which is unique (2-4,7,15-17). Research

by noted personality theorist provides us with models of how these general expressions can be categorized (17-20).

Table 1. Sample Of Chronic Illnesses And Disorders That May Have A Psychological Impact On Adolescent Development [9-13]

Medical		Mental /Behavioral
AIDS	Muscular Dystrophies	Anxiety Disorders
Asthma	Neurological Disorders	Attention Deficit/Hyperactivity Disorder
Chronic pain	Non Migraine Headaches	Body Dysmorphic Disorder
Cancer	Neurocutaneous Syndromes	Chronic Depression
Crohn's Disease	Obesity	Disruptive Behavior Disorders
Congenital Heart Disease	Osteoid Osteoma	Eating Disorders
Cystic Fibrosis	Psoriasis	Elimination Disorders
Diabetes Mellitus	Scoliosis	Communication Disorders
Epilepsy	Seizures	Learning Disorders
Guillain-Barr'e Syndrome	Sickle Cell Disease	Mental Retardation
Hemophilia	Sleep Disorders	Motor Skills Disorders
Hepatitis	Spina bifida	Other Psychotic Disorders
Hypertension	Syncope	Personality Disorders
Juvenile Rheumatoid Arthritis	Thyroid Disorders	Pervasive Developmental Disorders
Leukemia		Reactive Attachment Disorders
Lupus		Schizophrenia
Migraine Headaches		Sexual and Gender Identity Disorders
Multiple Sclerosis		Tic Disorders

Table 2. Stages of Adolescent Development [1, 2,3 4, 5, 8, 13, 16]

<p><i>Early Adolescence 10 – 14 year of Age</i></p> <p>Onset of puberty</p> <p>Neurobiological changes in the brain impact: speech, language</p> <p>Psychological Components</p> <p>Cognitive Growth results in major changes in mental abilities and thought processes:</p> <ul style="list-style-type: none"> Preoccupation with rapidly changing events of puberty Increased abilities to perform more complex mental tasks (thinking skills and problem solving skills) Improved mental processing speed and alertness Longer attention span Better judgment Better ability to adopt another person’s spatial perspective A clear sense of their own body image Clear sense of social standing with peer Comparison with peers and worry over perceived abnormalities Development of initial abstract thought The process of emancipation begins Establishment and maintenance of same-sex friendships Exposure to bullying and teasing (perpetrator, victim, or both)
<p><i>Middle Adolescence 14 – 18 year of Age</i></p> <p>Somatic growth spurt.</p> <p>Females, and males who engage in body image activities may find it difficult to maintain a personally desired weight or body size; this may result in dieting, excessive exercise, purging or other pathogenic weight control measures or body image problems.</p> <p>Psychological Components”</p>

- Significant symbolic movement away from the home environment
- Considerable need for independence
- Strong reliance on peers setting personal rules
- Heterosexual experimentation predominates
- Altruistic nature emerges
- Identification with non-parental adult role models
- Experimentation with sex, substance use or abuse
- Major changes in cognitive abilities and fantasy life
- Can engage in fantasy
- May become preoccupied with comparing their physical characteristics with peers
- Is developing theories about life
- Able to independently weigh consequences of decisions before taking action
- Ability to engage in inductive and deductive reasoning is expanding
- Can think about what they would like to do when they become adults
- May know and understand the consequences of risk taking behaviors, but their caution may be overridden by their stronger need for popularity and peer recognition
- May experience sexual fantasies
- These fantasies may occupy much of their time
- Some youth will fantasize about same sex peers and become very disturbed over these events
- Beginning to development of a positive self-image and increased confidence occurs as he or she consistently experiences success
- Is highly sensitive to negative comments from others and peer rejection, bullying, and traumatic personal experiences

Late Adolescence 18 – 21

Final pubertal changes physiologic fine tuning) occur

Psychological Components”

- Issue of emancipation from parents are essentially resolved
- Finalization of secure, acceptable body image and gender role
- Establishment of adult versus narcissistic sexual relationships
- Acquisition of adult lifestyle
- Considerable energy spent in establishment of vocational skills for training
- Cognitive abilities are more complex.
 - Abstract thought has been established
 - Empathy skills are well developed
 - Personal values clearer and well defined.
 - Is future oriented
 - Perceives and reacts upon long range options.
 - Beginning to resolve conflicts between themselves and their parents.
 - Continuing to develop th ability to think and function independently
 - Less influenced by peers
 - Uses own judgment for setting personal rules.
 - More actively participating is sexual experimentation
 - Predominate altruistic nature emerges.
 - Relationships with romantic partners are less narcissistic and more geared towards mutual respect and gratification.
 - Prefers the association with groups and or couples and prefers intimacy versus isolation.
 - Most adolescents at this stage of maturation have developed a strong sense of personal identity.
 - Capable of establishing and maintaining stable, mutually caring and satisfying interpersonal (including sexual) relationships.

Individuals manifest emotional reactions and temperament, e) attachment to family, peers, coping skills that are governed by their a) cognitive community, f) sense of autonomy, g) social capacity, b) intelligence, c) mental flexibility, d) competence, h) problem solving skills, i) coping

skills, and j) exposure to violence, substance, and poverty (see table 3) (8,15). Psychological development continues well into adulthood. During middle and late adolescence cognitive capacity expands to include abstract thinking and more complex thinking skills. Youth who had chronic illnesses during childhood, may not have mastered age appropriate psychological skills (cognitive,

emotional, social, integrative adaptive) (see table 4) (13,19,22). This means that these youth must expend their energy in skill acquisition versus refinement of their psychological development. Cognitive and emotional responses to their environment may appear “childish” and parents may complain that they are not being responsible.

Table 3. Domains of Function [8, 15]

<p>Psychological Components</p> <p><i>Cognitive</i></p> <p>Attention The ability to focus selectively and generally on events, actions and or information in the environment</p> <p>Mental Processing Speed (alertness) The ability to respond in an effective manner to physical, mental, emotional and physiological events in self to process information in a manner that allows for the appropriate adaptation of behavior to maximize positive outcomes and minimize negative outcomes</p> <p>Memory The ability to acquire, store, and recall recent, remote, and long term events, actions, information in an organized and useful manner.</p> <p>Thinking Knowledge of specifics, Comprehension, Application, Analysis, Synthesis, Evaluation, Decision Making, Problem Solving, Ability to monitor multiple events & people simultaneously</p>	<p><i>Social/Emotional</i></p> <p>Ability to regulate, modulate and control emotions Ability to establish new friendships Ability to maintain peer relationships Ability to establish and maintain healthy family relationships Integration and coordination of all of these skills</p> <p><i>Integrative/Adaptive</i> Ability to adapt skills and functions to meet demands of specific situations or conditions</p> <p><i>Other Domains of Function</i> Auditory Language Motor Perceptual Motor Visual</p>
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Impact of puberty/sexual maturation

All youth matriculate through three major stages (early, middle and late) of adolescence which occur in a dynamic, sequential, orderly and time-dependent manner (see table 2) (1-5,8,13,18). However, there is considerable individual variation in the onset, rate, and progression of an adolescents move through this process. That variation is significantly impacted by many factors: a) internal (including biological, neurological, physical growth, mental development) or external (changes in the adolescent’s personal, family, peer, school, and neighborhood environment, exposure to violence, trauma, chemicals, etc.) (1,3-

7,13,15). The effects can result in changes in any one of the essential components in the domains of function (see table 3) (8,15). The presence of a chronic illness can cause many of the factors mentioned above to impact psychological development of the adolescent.

The hallmark of adolescence is the onset of puberty, which can begin as early as age 8 or as late as age 15 years in females and as early as age 9.5 years and as late as age 15 years in males. Puberty ends when the adolescent reaches full physical and developmental maturity (which can be as late as age 21 years) (see table 2). Youth diagnosed with chronic illnesses such as intellectual disability, malnutrition,

diabetes mellitus (when glycemic control is poor) cystic fibrosis, sickle cell disease, or anorexia nervosa may experience delayed sexual maturation (23).. This may mean that the adolescent becomes emotionally distressed over not experiencing physical changes in

their bodies similar to those of their typically developing peers. Adolescents who do not experience the hormonal changes of puberty may not experience co-occurring changes in brain function (23).

Table 4. Psychosocial Issues that may be experienced by Chronically Ill Youth [13, 19, 28]

Personal	Parents	Siblings	Peers
Being disappointed in their bodies.	Feeling parents are angry at they because their chronic illness monopolizes parent’s lives	Feeling stress of sibling because of their adjustment and stigmatizing guilt and fear of having a chronically ill sibling	Social Rejection
Dealing with complex medical procedures	Detecting parental stress because of adjustment to chronically ill teen and stigmatizing guilt and fear about having a chronically ill teen	Detecting their siblings’ anger at them for monopolizing parental attention	Being made fun of because of their chronic illness
Feeling vulnerable	Realizing their parent’s fatigue from having to deal with acute and chronic stressors of implementing daily medical regimes	Realizing their siblings are embarrassed about their condition	Acceptance
Feeling illness is unfair	Recognizing their parent’s financial distress	Being rejected by healthy sibling	Collegial relationships
Having to continuously adapt	Knowing their parents are unhappy because of their inability to meet needs of spouse or their other children	Acceptance	
Lack of esteem	Rejecting their parent’s over-protectiveness	Collegial relationships	
Lack of confidence	Feeling rejection from parents because they are not what their parents expected		
Loss of life freedoms that are associated with excellent health	Acceptance		
Periodic, and often unpredictable, crisis events.	Collegial relationships		
Permanent lifestyle changes	Loving parental relationship		
Problems with emancipation			
Slowed or altered physical development and appearance			
Social limitations			
Social stigma			
Unpredictable course of illness			
Self Acceptance			
Joy of living			
Self Confidence			
Success			

As adolescents work to adjust to physical and hormonal changes caused by puberty, the presence of a chronic illness may significantly alter their ability to master the tasks of adolescence: Individuation,

emotional and behavioral regulation, ability to initiate and maintain reciprocal intimate relations, development of skills that support independence (4,9,21,24,25). Chronic illness may also result in over

involvement of parents in to personal functioning (especially when bathing and toileting are involved) impeding the adolescent's ability to develop self confidence, feeling of independence, and opportunities for healthy sexuality development.

Impact on the adolescents relationships with family

The impact of chronic illness on family relationships is dependent the specific illness, its severity, how it affects the adolescent's body, how and if the functional limitations are perceived, what kinds of treatments are involved, and whether the symptoms of the illness or the results of treatment are manifested publically. For instance, spina bifida may impair an adolescent's ability to walk; siblings who see their "sick" sibling on crutches or in a wheel chair may be embarrassed by the visual images when they are around peers and the public. Those siblings may then treat the "sick" sibling differently; the adolescent with chronic illness may feel angry or saddened by this reaction. Youth who have loss their hair because of their chronic illness (alopecia) or chemotherapy also presents visuals for the individuals that can result in rejection, embarrassment and other emotions in sibling and thus cause reciprocal emotions in the chronically ill teen. Members of the family, especially parents may restrict/limit the ability of their teen to individuate and move towards emancipation. Parents may also become overprotective and limit their teen's access to activities that may give them opportunities to be with other youth of similar interests. The well intentioned family members may actually cause frustration for the teen and impede possibility of "typical" development.

Although the illnesses of asthma or diabetes may not be readily visible, if the teen has public displays of their illness in front of peers (i.e. a) an asthma attack, or b) the teen with diabetes begins to shake and get confused as the result of hypoglycemia) those illnesses also become visible or public. If the teen has to go to the office to take shots or use an inhaler before exercise or an outing, the illness becomes public. Other teens will "know." Most adolescents between ages 10 and 16 years will become very upset about these events because being different or a public

spectacle is something to be avoided at all costs. Younger adolescents may be too embarrassed to return to the setting of a psychologically traumatic event (public display of their illness). However, if these same events occur when the teen is 17 years of age, he or she might be less psychologically traumatized and simply ask for help and explain to peers what just happened (see case example 1).

Psychological development may also be impeded when there are visible signs of chronic illness - such as the loss of hair from chemotherapy, obesity due to medications (such as corticosteroids), or congenital conditions or injuries; these signs may result in the adolescent retreating from social situations. She may avoid contact even with former friends. Older adolescent may be helped to rationalize emotions about these visible signs of their illness and be prepared to address them with peers and others. Youth who appear younger than their chronological age may face various forms of discrimination or be treated like a younger child by adults who interact with them (case example 2).

Case story 1

For instance the youth who develops type I or insulin dependent diabetes at age 9 years usually adjusts well at this age and displays very responsible eating and exercise habits (with supportive parental help). Then at age 15 years, Mark begins to eat extra unhealthy foods, does not tell his parents; he also does not adjust his fast acting insulin to compensate for the extra foods. He said it he did not want to be different from his peers, he wanted to be like everyone else. He hated having diabetes. Mark is told he can adjust his insulin to allow some variation in his diet, yet he lies to his parents and physician about his diet and blood sugar levels. When his parents find out, they are livid, scared, and distressed. Many arguments result. Mark becomes very moody and resentful. Yet he repeatedly engages in this behavior and suffers the wrath of his parents and physician. When his parents present in the physician's office with Mark, they describe their son as a liar, a sneak, and an irresponsible teen who is killing himself.

The physician referred the family for counseling. A comprehensive psychological evaluation that

includes developmental assessments. Results of testing and interviewing show that the Mark has above average intellectual function (verbal and non verbal), is mildly depressed but basically he is a very mentally healthy person who responds cognitively to emotional distress as a 9 or 10 year old. The psychologist tells Mark and his family that Mark's resistance to parental direction and non-compliance with his medical regime is the result of Mark's emotional development. Mark had not yet gotten past a concrete stage of intellectual development because when he was at that stage, he experienced the psychological trauma of being diagnosed with a chronic illness. When he acted out, Mark was not able to understand the long term consequences of not controlling his blood sugars. He could only focus on not wanting to be different from his peers.

Most of the literature on treatment responsibility (self efficacy) recommends that parents help their children be as independent with treatment regimes as possible. However, parents may need assistance in identifying when they have turned over too much care or have decreased their emotional involvement too much. Mark's parents were encouraged to make shot time and glucose testing times opportunities to spend "quality" time with their teen. They did not have to administer the procedures, but might sit with the teen and ask him about various events in his life or tell him about events in their lives. Mark was encouraged to help make these pleasant times also. Mark's parents were told to have the end goal of fading that level of involvement as their teen complied with treatment.

Psychoeducation was used as a major technique to help Mark. This included the teaching of coping skills, nurturing abstract thinking and helping him understand the relationship between his everyday behavior/actions and his long-term health. Mark was also helped to understand the motives of his parents and their fears about his long-term health. The clinician pointed out that his parents were reacting out of fear for their son's life, not because they hated him. With education, Mark's parents were able to view their son's emotional needs, and understand his behavior as a part of normal adolescence development; they were given strategies to intervene with Mark that respected their teen's chronological age and met his emotional need of more concrete

instructions and more parental attention to the medication regime

Case story 2

Charles is a 15 year old male diagnosed with cystic fibrosis. Charles was short stature, had a high pitched voice, no facial hairs, and had not yet started to experience puberty. He was being seen by a clinician for help with anger management. Charles is short stature, has a slight frame and facial feature more like a nine or ten year old. At their first meeting the clinician greeted Charles as she does most "children" his perceived age. She bent down to shake his hand, leaned in and said "Hello, young man. How are you today?" When she escorted Charles and his mother to their respective seats, she told him he was welcome to sit any where he liked or could stay close to his mother if he felt safer. Charles began to get angry, he glared at the clinician. The clinician had not read his referral letter in a couple of weeks and went by her perceptions of his age and developmental stage. Next, she said: "Now, I am going to ask you some hard questions (she was joking) that most kids your age might struggle with, but I bet you know the answers."

Charles had enough! He said, "Look, stop being condescending to me! I am not a child, I am 15 years old and would appreciate you respecting me as a young man and not treating me like a child!" The clinician, realized the error of her ways, quickly apologized and told Charles she had read his referral letter a couple of weeks ago and was treating him inappropriately. She asked for his forgiveness and said, "Charles, would allow me to start over?" Charles agreed and the rest of the meeting went well. He completed evaluation and therapy and at follow-up, he said he was able to effectively employ the anger management techniques he learned. His mother supported the claim. Charles complete therapy with the clinician and both he and his mother gave her high satisfaction rating.

Developing psychologically healthy adolescents with chronic illness

Youth who are born with chronic illnesses can grow up to be psychologically healthy if they have all of the characteristics and factors in their lives that researchers have found to be present in resilient youth. Those youth that develop a chronic illness a different stages in their lives may experience psychological problems because of the loss of

function, However some researchers have found that those youth who do not perceive a loss of function and who have peer acceptance, will be able lead socially and emotionally healthy lives. Research on resilience in adolescents (with and without chronic illness) shows that resilient youth are better able to handle the complexities of growing up (see table 5) (26-29).

Table 5.Characteristics of Resilient Youth [25, 26, 29, 31]

Internal
Gender Being male
Psychological
Sense of Autonomy Positive sense of independence <ul style="list-style-type: none"> • Emerging feelings of efficacy • High self-esteem • Impulse Control • Planning and goal setting • Belief in future
Social Competence <ul style="list-style-type: none"> • Responsiveness to others • Conceptual and intellectual flexibility • Caring for others • Good communication skills • Sense of humor
Problem-Solving Skills <ul style="list-style-type: none"> • Ability to apply abstract thinking • Ability to engage in reflective thought • Critical reasoning skills • Ability to develop alternative solutions in frustrating situations
External
A. Family <ul style="list-style-type: none"> • A healthy family environment • Parental acceptance of and ability to cope with their adolescents chronic illness (es) both emotionally and financially. • Strong family connectedness and cohesion • Socio-economic class (access to and possession of resources to meet family an chronically ill adolescent’s needs)
B. Community/School <ul style="list-style-type: none"> • Acceptance by classmates and peers of the adolescents special needs. • Positive peer relationships • Lack of exposure to violence
<ul style="list-style-type: none"> • Lack of exposure to substance • Minimal exposure to trauma • Teachers who provide academic adaptations that meets adolescent’s needs • A supportive social network • Peers who do not engage in maladaptive behavior

Youth with chronic illnesses who are also resilient show the same qualities. The ability to be resilient is a very important component of survival for all youth but especially those with chronic illness. Resilience is the capacity to successfully undertake the work of each successive developmental stage (see table 4) in the face of significant factors that predispose to vulnerability and adapt to those conditions in a manner that improves their trajectory (13,15,21,22,25-27).

Intimate relationships

Peer relationships provide the second most important influence on adolescent development (15). Peer interactions afford the opportunity to interact in an equal status relationship and reinforce cultural norms. The support network of chronically ill youth usually includes parents, siblings, peers, counselors, caring health care professionals; however, a survey of these youth supported that chronically ill youth said their pets also played an important role in providing a listening ear and emotional comfort (11). They further reported that they need direct communication from their doctors, teachers and other care givers; and benefited best from honesty, attention to their reports of physical and emotional pain. The researchers concluded that they teens understand both the value of the scientific and interpersonal aspect of care (12,28,31,32).

Impact on experimentation and risk behavior

Adolescence is a time where youth begin to experiment with making personal decisions, challenging the religious beliefs of their parents, making a variety of friends, defying parental rules and beliefs, trying different styles of dressing, hair, makeup, and talking. Some youth will want to get tattoos or body piercings, experiment with their sexuality, engage in sexual acts, use substances (smoke or chew tobacco, marijuana, heroin, cocaine, drink alcohol), and or other drugs (10,32). Having a chronic illness does not prevent experimental behaviors during adolescence; these youth can be expected, as will their peers, to test their own limits.

The opportunities to have access to peers, purchase items, go shopping without parental supervision, be alone with a sexual partners, or be alone with peers may be impeded by the severity of their illness and their physical limitations; however experimental behaviors are not rarer in adolescents with a chronic condition (31,32). It is important that these youth be afforded privacy to experiment so that they do not get involved in experimenting sexually with age inappropriate youth or public masturbation.

Conclusions

Youth who do not experience typical development as a result of chronic illness may experience psychological or psychosocial problems (see table 1) (3,5,9-13). As adolescents work to adjust to physical and hormonal changes caused by puberty the presence of a chronic illness may significantly alter their ability to master the tasks of adolescence: Individuation, emotional and behavioral regulation, ability to initiate and maintain reciprocal intimate relations, development of skills that support independence. External factors such as family support and resources, peer acceptance, and academic support and resources can have a major impact on the psychological development of these teens. When working with youth who have chronic illnesses, it is vital that clinicians remember that these youth are subject to the same statistical risk from experimentation with sex, drugs, and other risk taking behavior. They must also be aware of the impact of those chronic illnesses on the psychological development of each individual adolescent. Youth diagnosed with chronic illness can lead very psychologically healthy lives given a) individual strengths of cognitive flexibility, intelligence and hope (see table 5); b) a supportive family environment and resources; and c) peers who accept and value them; and d) teachers and classmates who provide a positive learning environment with resources to meet or adapt to the needs of these youth.

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Socio-demographic determinants of malaria in pregnancy

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Abstract

Context: Malaria is known as a disease of poverty, but there is a dearth of evidence to collectively summarize how social and demographic factors predict its incidence among pregnant women.

Objective: To summarize evidence on socio-demographic determinants of malaria in pregnancy.

Data sources: Electronic databases of OVID, MEDLINE, LILACS, EMBASE, PsycINFO, Science Citation Index and Social Science Citation Index, ERIC and reference lists of articles were searched for 1998-2008. **Selection criteria:** Two independent reviewers selected studies for inclusion if they expressly investigated or included investigation of social and/or demographic determinants of placental malaria or parasitemia in pregnancy. **Data extraction:** Data on study settings, designs, methods, population characteristics, relationship between socio-demographic variables and malaria were assessed. **Data synthesis:** Of the 98 studies found, 19 met the inclusion criteria. Overall, socio-demographic determinants of malaria in pregnancy were found to be age (less than 21 years), parity (more than 1 child), socioeconomic status (measured by absence of electricity in the house), trimester of pregnancy, seasonality (rainy season), geographic location (rural residence), HIV infection, and use of malaria prophylaxis. One study found an association with ethnicity. **Conclusion:** Given that age, parity, rural residence, low socioeconomic status, and HIV infection were found to be strong predictors of malaria in pregnancy, maternal and child health programs as well as malaria control programs must pay special attention to women with these characteristics if their interventions are to have optimum impact. Programs that target prevention of mother-to-child transmission of HIV should incorporate effective malaria prophylaxis and treatment to counter the effects of HIV on pregnant women with malaria.

Keywords: Malaria, pregnancy, social determinants, maternal health, pregnancy outcomes, demographic factors.

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Introduction

Malaria is responsible for disproportionately large morbidity and mortality worldwide. Every year, 300

million people suffer from the disease and its complications. Annually, an estimated 400,000 women suffer severe anemia as a result of malaria infection (1). Pregnant women, their unborn fetuses, and infants account for most of these preventable deaths from malaria (2). Ninety percent of the mortality from malaria occurs in sub-Saharan Africa. It has been estimated that 1.3% of the Gross Domestic Product (GDP) is lost to malaria annually by endemic countries in Africa. This is equivalent to \$12 billion annually for the continent (3). Maternal anemia causes an estimated 10,000 maternal deaths per year, while malaria is responsible for 20% of infant deaths in Africa (3). The fact however, is that many of these children are either never born due to intra-uterine growth retardation and death or are born prematurely with low gestational weights (4).

The underpinning factor for the high incidence of malaria is the predominance of a very effective vector, the *Anopheles* mosquito in sub-tropical and tropical parts of the world. The efficiency of *Plasmodium falciparum* and its particular placental pathology makes it a viable vehicle of devastating consequences for mothers and their children. While the literature is replete with evidence on the accentuating relationship between pregnancy and malaria, the evidence has not been fully reviewed to elucidate the socio-demographic determinants of malaria in pregnancy. This review attempts to summarize studies on predictors of malaria in pregnancy in order to contribute to advocacy and priority setting for programs that seek to prevent malaria in pregnancy.

Methods

We searched online databases, scanned reference lists and hand-searched journals for potentially eligible studies. Specifically, we searched PubMed, OVID, MEDLINE, LILACS, EMBASE, Combined Health Information Database (CHID), National Research Register, PsychINFO, ERIC, Science and Social Science Citation Index, Dissertation Abstracts, Online Computer Library Centre (OCLC) and other bibliographic databases. The search covered articles published in English between January 1998 and September 2008. Among the terms and concepts

searched were: determinants of malaria in pregnancy, predictors of malaria in pregnancy, economic status and malaria in pregnancy, education and malaria in pregnancy, social status and malaria in pregnancy, urban-rural differentials in malaria in pregnancy, ethnicity and malaria in pregnancy, parity and maternal malaria, gestational age, malaria and pregnancy, HIV and malaria in pregnancy, bednets and malaria in pregnancy, malaria prophylaxis and malaria in pregnancy, and seasonality and malaria in pregnancy. To identify studies published in the “gray” literature, we systematically reviewed the bibliographies of all relevant publications, searched the System for Information on Gray Literature in Europe database (SIGLE), the Grey Literature Database of the New York Academy of Medicine, and Grey Literature Network Service (GreyNet) which covers information produced on all levels of government, academia, business and industry in electronic and print formats not controlled by commercial publishing. We also explored online resources (Google and Google Scholar) extensively.

Two reviewers (Shuaib and Ehiri) screened titles and abstracts to assess their eligibility for inclusion in the review. Hard copies of studies that were potentially relevant were retrieved for further assessment. In assessing the quality of studies, we used the Cochrane Collaboration’s standard method for study quality assessment (5). The search yielded 98 potential studies. Of these, 19 studies involving 25,647 participants qualified for inclusion and were retained for the review. The excluded studies were unclear regarding how the authors controlled for blinding of assessors (6) and for cohort and case-control studies, baseline comparability between study and control groups with respect to the socio-demographic variables of interest was unclear. They were also unclear with respect to contemporaneous data collection (data collected at similar time periods) for both control and study sites.

Results

Outcome measures for malaria in pregnancy included thick or thin film microscopy showing asexual forms of the parasite, peripheral malaria, placental malaria, parasitemia or Polymerase Chain Reaction (PCR). Of

the 19 studies, thirteen (7-19) assessed malaria based on thick or thin film microscopy showing asexual forms of the parasite; two examined placental malaria alone (19,20), while one used a combination of peripheral and placental malaria (21); two used peripheral parasitemia and Polymerase Chain Reaction (PCR) (22,23). Only one study used submicroscopic malaria diagnosis using RCR. The following section summarizes findings of the review. Key results are highlighted in table 1.

Age

Nine studies (7-10,18-20,24,25), which were all conducted in sub-Saharan Africa examined the influence of age on malaria prevalence/incidence among 958 women under 21 years of age and 845 women above the 30 years of age. Of these, seven demonstrated an inverse relationship between maternal age and maternal placental or peripheral malarial parasitemia. One study (25) found no significant relationship between maternal age and malaria while the other (7) found increasing maternal parasitemia with increasing maternal age. Among the afore-mentioned seven studies, the measures of effect ranged from an odds ratio of 1.98 (CI =1.70-2.31) in the case of Van Eijk et al (9) in Kisumu, Western Kenya to 2.48 (CI=1.19-5.16) in Bandiagara, Mali (10).

Parity

Fifteen studies (7-10,12-14,16,18-20, 22, 24-26) investigated the relationship between parity and malaria in pregnancy. Of these, two (12,13) were in the Indian subcontinent and their findings were similar to studies conducted in Africa. Higher parity was found to protect against malaria infection in eleven of the fifteen studies. The strength of this association ranged from an adjusted odds ratio of 1.66 (CI= 1.27-2.17) (21) to 2.29 (CI=1.60-3.26) (18). From Southern Mozambique, Saute et al (24) showed that age and not parity was significantly associated with increased risk of parasitemia. Further corroborative evidence was provided by three other studies Adam et al (25,26) and Elghazali et al (22),

which showed that malaria was not associated with parity in Eastern Sudan, an area of unstable malaria transmission. In one study done in the Jayapura provincial Hospital of Indonesian Papua New Guinea (16), pregnant women showed no higher risk of severe malaria (P=0.643) or death (P=0.771) compared to non-pregnant women.

Gestational age of pregnancy

Six studies investigated gestational age and the role of malaria, with conflicting results. While two studies (22,25) in North Africa and one in India (12) found the 3rd trimester to be more hazardous, two others in West Africa (7,10) (found the 1st trimester to have a higher incidence of maternal malaria. Interestingly, one study conducted in Southern Mozambique (24) found the 2nd trimester to be the riskiest.

HIV status

Five studies, all in East Africa (9,15,21,23,27) investigated the relationship between maternal malaria and HIV status. They all showed that the relative risk (RR) for parasitemia in HIV+ positive pregnant women was higher than in HIV- pregnant women (RR range: 1.54 (95% CI=1.05-2.26) to 2.40 (1.64-3.53)). Van Eijk et al (21) stratified parasite density by gravidity, and demonstrated a loss of protection with increasing parity when pregnant women were HIV+. Their comparison of malaria parasitemia in 1st pregnancy among HIV+ women with malaria parasitemia in HIV- women demonstrated a relative risk of 2.40 (CI=1.64-3.53). For the 2nd pregnancy, the relative risk was 2.54 (CI=1.32-4.86), and RR=2.66 (1.10-6.43) for 3rd pregnancy,

Use of malaria prophylaxis and bednets

Three studies investigated the effect of malaria prophylaxis on peripheral parasitemia. Brentlinger et al (18) and Van Eijk et al (21) assessed the use of Sulfadoxine-pyrimethamine (SP).

Table 1. Summary of findings

Study ID	Objective	Design	Population	Outcomes	Results		Remarks
					<20 year	30-39 years	
Age					<i>Adj. OR (95% CI)</i>	<i>Adj. OR (95% CI)</i>	
Saute et al. 2002 (Southern Mozambique) (8)	To assess the prevalence of Malaria parasitemia and anemia in relation to age and parity in pregnant women	Cross-sectional	686 pregnant women	Malaria peripheral parasitemia and anemia	Ref	0.3 (0.1-0.8)	P<0.05
Tako et al. 2005 (Yaoundé, Cameroon) (9)	To evaluate the prevalence of placental malaria with respect to gravidity and maternal age	Cross sectional	1,944 pregnant women	Placental parasitemia and anemia	2.0 (1.3-3.0)	1.0 (0.7-1.4)	Prophylactic antimalarials used by 76.3% of participants
van Eijk et al. 2002a (Kisumu, Western Kenya) (14)	To assess risk factors for malaria in pregnancy	Cross-sectional	2,502 women who delivered in hospital and included in analysis	Peripheral malaria parasitemia	1.69 (1.43-2.00)	Ref.	Age group <20 includes <21 years P<0.05
Dicko et al. 2003 (Bandiagara, Mali) (12)	To identify risk factors for malaria infection in pregnant women	Cross-sectional	235 pregnant women	Malaria parasitemia in thick blood film	2.5 (1.19-5.16)	Ref.	Age comparing ≤27 years to ≥27 years
Brentlinger et al. 2007 (Central Mozambique) (13)	To find out factors associated with maternal peripheral parasitemia	Cross-sectional	5,528 pregnant women	Maternal peripheral parasitemia	0.96 (0.94-0.99)	Ref.	
Adam et al. 2005a (Eastern Sudan) (15)	To demonstrate the prevalence and risk factors for malaria	Cross-sectional	744 pregnant women	Malaria parasitemia in thick and thin blood film	0.90 (0.52-1.6)	Ref.	Age comparing ≤25 years to ≥25 years
Adam et al. 2005a (Eastern Sudan) (15)	To demonstrate the prevalence and risk factors for malaria	Cross-sectional	744 pregnant women	Malaria parasitemia in thick and thin blood film	1.1 (0.7-1.7)	0.96 (0.62-1.4)	Multi-gravidae =3 to 5 pregnancies
Saute et al. 2002 (Southern Mozambique) (8)	To describe the prevalence of Malaria parasitemia and anemia in relation to age and parity in pregnant women	Cross-sectional	686 pregnant women	Malaria peripheral parasitemia	Ref.	0.7 (0.3-2.0)	Multi-gravidae≥5 pregnancies
van Eijk et al. 2002a (Kisumu, Western Kenya) (14)	To assess risk factors for malaria in pregnancy	Cross-sectional	2,502 women who delivered in hospital and included in analysis	Peripheral malaria parasitemia	1.23 (0.91-1.67)	Ref.	P<0.05
Tako et al. 2005 (Yaounde, Cameroon) (9)	To evaluate the prevalence of placental malaria with respect to gravidity and maternal age	Cross-sectional	1,944 pregnant women	Placental parasitemia and anemia	1.5(1.0-2.2)	Ref.	Among 1,016 women ≥25 years, prevalence of placental malaria is not significantly different

Keys: Ref.= Reference Group.

Both studies demonstrated a reduction in parasitemia associated with use of malaria prophylaxis OR=0.49 (95% CI=0.48-0.50) for Brentlinger et al (18), and OR=0.32 (95% CI=0.14-0.67) for Van Eijk et al (9). One study (10) found that Chloroquine was protective (OR=0.66 (CI=0.21-2.03)). It should be noted that only Brentlinger et al (18) objectively assessed the number of doses and frequency of anti-malarials use.

While the frequency of bednets use was not clearly defined by the two studies that assessed them (14,18), they both showed protective effect for bednet use among study participants. Brentlinger et al (18) found an OR=0.49 (CI=0.48-0.50), while Marchant et al (14) found that parasitemia among bednet users and non-bednet users was 25% and 33% respectively (P=0.006).

Rural/urban residence

Two studies examined the relationship between living in a rural or urban area and malaria infection among a total of 2,737 pregnant women. Dicko et al (10) found that living in a rural area is associated with a two-and-half fold increase in malaria infection: OR=2.49 (CI=0.99-6.27). Van Eijk et al (9) found a risk ratio of 1.27 (CI 0.99-1.63) for pregnant women living in peri-urban areas of Kisumu, Kenya.

Seasonality

Four studies (10,24,9,26) investigated the relation between seasonality and malaria in pregnancy. Dicko et al (10) found a significant association between rainy season and the rate of malaria infection among pregnant women, OR=4.85 (95% CI= 2.42-9.75). Saute et al (24) showed that the end of the rainy season was a risk factor, OR=2.2 (CI 1.4-3.0, P<0.05) for parasitemia in pregnancy in a cross sectional study of 686 pregnant women in Southern Mozambique. Van Eijk et al (9) did not demonstrate any difference in the level of peripheral parasitemia based on seasonality RR=0.97 (95% CI =0.84-1.13). Adam et al (26) using PCR to detect submicroscopic parasitemia also found no statistically significant difference between the rainy and dry seasons.

Ethnicity

Only Dicko et al (10) and Van Eijk et al (9) assessed the relationship between ethnicity and maternal malaria. Among 2,502 pregnant residents of Kisumu in Western Kenya, Luo ethnicity was found by Van Eijk et al (9) to be associated with an 80% odds of malaria parasitemia compared to the other ethnicities, Luhya, Kissii, Kikuyu, Kalenjin and Nandi, (RR=1.81 (CI= 1.38-2.39)). The Luo people live within an area that stretches from Southern Sudan, through northern Uganda and Eastern Congo (DRC), into Western Kenya, and ending in the upper tip of Tanzania. Dicko et al (10) in the semi arid areas of Bandiagara, Mali found no statistically significant association between Dogon ethnicity and non-Dogon ethnicity in univariate or multivariate analysis.

Socioeconomic status and education

One study in central Mozambique (18) investigated the role of socioeconomic status and education. They demonstrated that among 4,157 pregnant women in a syphilis study site, socioeconomic status (as measured by absence of electricity at home) was associated with maternal peripheral malaria parasitemia (OR=1.71 (CI=1.19-2.47)). The same study showed that not having school education was associated with increased risk of malaria among pregnant women, OR=1.38 (95%; CI=1.15-1.66).

Discussion

The position of randomized controlled trials (RCTs) as the gold standard with regard to study design quality is widely acknowledged. It is also known that there are many challenges in conducting such studies in less developed countries, including resource, logistical and ethical constraints. It is therefore, not surprising that none of the included studies was an RCT. Most were cross-sectional studies, and a few were cohort and case-control studies. In interpreting the results therefore, readers should take adequate cognizance of the limitation of these studies. For example, questions about use of bednets, malaria prophylaxis and treatment relied on self-reports (28),

that are known to be subject to recall bias (29) and social desirability (30). Nevertheless, the consistency of the associations across studies in different settings points to the validity of the results.

Age

An overwhelming majority of studies found that age was a strong determinant of the prevalence and severity of maternal malaria (7,8,10,18-20,24). These studies show that in areas of stable, high malarial transmission, maternal age is an independent predictor of malaria in pregnancy. Young primigravidae and multigravidae, especially those under 20 years of age are at greater risk of malaria and its adverse effects than older primigravidae and multigravidae (18). Tako et al (20) demonstrated this relationship in a study in Yaoundé, Cameroon. After adjusting for confounding variables, they found that age and not gravidity was a major risk factor for placental malaria ($P=0.008$). Corroborative evidence was provided by a similar study in Mali where the over-riding risk factors for malaria were not gravidity but age, rural residence and season (10). Likewise, Okwa et al (7) found that women aged 30-39 years had a higher rate of parasitemia compared to those aged less than 20 years. The study however had a disproportionately larger number of participants in the 30-39 years age bracket ($n=559$; 70%) than those in the under 20 years age group ($n=15$; 1.8%).

In interpreting results of this study, it is important to note that participants were all on various types of malarial prophylaxis. Participants were likely to have had variable adherence to their prophylactic regimens. The anti-malarials also have different efficacies, thus making it inaccurate to conclude based on the data that the older women have a higher prevalence. It is important to note that while evidence abounds on the inverse relationship between age and malaria in pregnancy, there are studies that have failed to demonstrate this association. For example, Nnaji et al (8) working in Nnewi, Eastern Nigeria, found that though there was a higher prevalence of malaria parasitemia in pregnant women under 20 years of age compared to those aged between 30 and 39 years, the difference was not statistically significant. Similarly, in their study in Eastern Sudan, an area characterized

by unstable malaria transmission, Adam et al (25) found no significant association between malaria and age.

In interpreting the effects of age on malaria in pregnancy, it is important to consider the role of socioeconomic factors (18). Compared to teenage and young adult mothers, older women are more likely to be of higher socioeconomic status (as measured by education and income) and may have more experience of managing health issues during pregnancy, including nutrition and malaria prophylaxis (31). Thus, malaria control program planners and implementers should consider pregnant teenagers and young adults as at-risk populations with special need for protection against malaria. Oftentimes, these groups of mothers may be unmarried and either in school or out of school. Typical clinic based reproductive health services for older, married women will not work for them (32). Where pregnancies are out of wedlock, very few of the young women are likely to present for prenatal care (33). Insecticide treated bednets which by priority are distributed through prenatal clinics will therefore not reach them (34). They neither receive intermittent preventive therapy against malaria (IPT-SP) nor will there be the high index of suspicion recommended by the WHO triad for effective management of malaria in pregnancy (32). Special interventions should be devised to target these groups if maternal and infant mortality from malaria is to be reduced in malaria endemic regions.

Parity

Of the fifteen studies included in the review that investigated the influence of parity on malaria in pregnancy, nine (7-10,12,13,19,20,24) demonstrated a positive relationship between parity and malaria. Overall, the studies indicate that the risk of malaria in pregnancy decreases with increasing gravidity. Prevalence and susceptibility to severe malaria are more common in primigravidae compared to multigravidae. The acquisition of immunity with subsequent pregnancies has been proffered as an explanation for this. In a study in Western Kenya, Fried et al (35) showed that anti-adhesion antibodies are produced by multigravid women against malaria

parasites which tend to sequester on the syncytiotrophoblast of the human placenta. Production of these antibodies requires immunological memory from a previous pregnancy (35). The produced antibodies prevent *Plasmodium falciparum* parasites from binding to chondroitin sulphate A (CSA) molecules on the placenta (35). As a result, multigravidae clear malaria parasites better than primigravidae. The implication of this is that immunity against malaria improves with subsequent pregnancies and the anti-cytoadherence antibodies produced by the body starts after the first pregnancy (35). It is possible that this phenomenon could serve as the basis for production of vaccines against malaria for global use.

It was interesting that Elghazali et al (22), Saute et al (24) and Adam et al (25,26) did not demonstrate statistically significant association between malaria parasitemia and parity. In interpreting results on association of parity and malaria, it is germane to recognize the strong colinearity between age and parity that may make it difficult to completely extricate the overlapping influence of each in a regression model. Secondly, there is also the distorting effect of a high HIV infection rate in the study area; HIV infection is known to distort the parity pattern of malaria infection in pregnancy (36). The studies in Eastern Sudan (25,26) characterize the expectation of malaria patterns in an area of unstable malaria transmission (37). Here, there was no difference in the malaria parasitemia based on parity level.

Gestational stage of pregnancy

Pregnancy is a state of altered immunity resulting from immune modulation from cellular responses to humoral immunity (38). Acquired immunity from malaria wanes during pregnancy (37) especially during the first pregnancies as noted earlier. Consequently, a pregnant woman becomes as vulnerable to malaria as a non-immune child (39). Susceptibility to malaria is thought to start as early as the twelfth week of pregnancy. Before this time, the incidence or at least the clearance of malaria parasite is similar to what is observed in the non pregnant female (39). Two of six studies demonstrated higher

susceptibility in the 1st and 3rd trimester, while one (24) indicated greater risk in the second semester. The latter finding is in harmony with findings of the review by Desai et al (2), which indicated that the second trimester remains the most vulnerable period for malaria infection in all mothers. Yet, some others have reported that the last trimester (37) and first trimester (40) may be equally risky. Based on their work in Eastern Sudan, Elghazali et al (22) found that the peak incidence of malaria was the third trimester. They however attributed this finding to the fact that most of the patients presented for prenatal services towards the end of the second semester.

In his analysis of malaria in pregnancy in Africa, Brabin (41) likened the situation of malaria in pregnancy to one in which an infant or child acquires immunity to malaria over a couple of years. The pregnant woman on the other hand, first loses this immunity, and then reacquires it over a period of nine months. Thus, the effectiveness with which she reacquires this immunity may vary in accordance with the initial level of immunity (3) and the competence of her immune system, which in turn, is predetermined by a host of other factors including her nutritional status. Most studies illustrate that the peak in malaria susceptibility is the second trimester but the truth lies possibly somewhere between the second and third trimesters for each individual. Clearly, adequate provision for prevention of malaria needs to target the entire duration of the pregnancy.

Seasonality

Van Eijk et al (9) found a lack of difference in the risk of malaria by season of the year in their study despite perennial transmission of malaria. The reason for this has not been fully elucidated. In an area of unstable malaria, Adam et al. also found no disparity in transmission by season even at the submicroscopic level (26). Dicko et al's (10) findings were consistent with that of other investigators who found a significantly increased risk for malaria parasitemia during the rainy season, OR=4.85 (95% CI = 2.42-9.75). There is a higher rate of inoculation by insects during the rainy season compared to the dry season (40). Mosquito breeding increases during the rainy season as water tends to collect in clear, still, sun-

exposed receptacles such as ponds, wells, water tanks, paddy fields and indiscriminately disposed bottles, tins and coconut shells (42). The warm temperatures and humidity also promote mosquito longevity and parasite sporogony. Pregnant women are also at risk of mosquito bites as the rainy season is also associated with increased involvement in agricultural activities. It has been shown that mosquitoes have a higher predilection for pregnant women compared to non-pregnant women (43).

Geographical site (Urban/rural residence)

Disparities in the prevalence of malaria and the susceptibility patterns of populations are seen in urban and rural areas. Brentlinger et al (18) found a higher prevalence of malaria parasitemia in women from rural areas (48.1%) compared to those from an urban clinic (8.8%) where there was an indoor residual spraying campaign. This difference was persistent despite the inclusion of women who had recently taken preventive Sulphadoxine-pyrimethamine (SP) in the rural site and notwithstanding the higher seroprevalence of HIV in the urban site. This finding was consistent with those from another study conducted in Bandiagara, Mali (10), which found that residence in the rural area was associated with a 2.5-fold increase in the odds of malaria parasitemia OR = 2.49 (95% CI = 0.99-6.27).

Residents of urban areas tend to be more affluent and take steps to prevent contact with parasites. Disease control programs in these places are frequently better managed. Availability of different brands of insecticides with varying price ranges means residents are able to choose from available brands. Disparity in the distribution of health infrastructure and services between rural and urban areas also means that bednets and large scale insecticide use favor urban residents. As noted earlier, availability of programs to reduce malarial parasitemia e.g., in women who use bednets and malarial prophylaxis is significantly associated with lower incidence of malaria (2).

Another factor that may alter the risk to malaria in urban population is the spraying of houses with insecticides especially in the urban areas (44). The higher incidence of HIV in the urban setting may

however alter the overall picture. Thus the actual effect of the urban-rural differential may be masked by the unknown HIV serostatus of the rural dwellers and the known status of the urban dwellers (18). Poor nutrition and seasonal changes in nutritional level of rural dwellers may also impact on their immunity response to malaria (2). In developing countries such as Malawi and Nigeria, those who live in rural areas are also more likely to be in the low socioeconomic strata. A large proportion of these groups are outside the delivery loop of the orthodox health care system (45). Even if they have access, poor literacy level predicts their tendency to self-treat, delay presentation to the clinic and hence they suffer the consequences of delayed therapy (46). Thus, any program designed to reduce malaria in these populations must look holistically at predisposing factors, such as poverty, and presence of chronic infections (e.g., helminthiasis) which increase their susceptibility to malaria and accentuate the effect of hemolysis from acute malaria (47). Comparative studies have shown that residents of urban areas expend a larger proportion of their income in procuring insecticide sprays and mosquito screening than those in the urban areas (44).

Ethnicity/region

Only one Kenyan study examined the significance of ethnicity as a determinant of malaria in pregnancy (21). In this study, being of Luo ethnicity was a risk factor for malaria at delivery (RR= 1.74, 95% CI = 1.35-2.24). However, when gravidity and use of Sulphadoxine-Pyrimethamine were excluded, the risk ratio reduced (ARR=1.43, 95% CI= 1.10-1.85). Dicko et al (10) did not find any association between ethnicity and malaria in pregnancy in Bandiagara, Mali. Further studies need to be conducted to compare this observed role of ethnicity in other ethnic groups inhabiting the same area in order to exclude potential confounders. Though none of the studies explored the role of Duffy antigens in modulating P vivax malaria, studies have demonstrated that being of West African origin confers protection from P vivax as a result of the absence of Duffy antigens on the red blood cells. It is therefore not surprising that maternal malaria from P vivax is less prevalent in this area compared to

other areas. Besides, *P. vivax* is not associated with the type of placental cytoadherence observed with *P. falciparum*. In other regions of the world such as South and East Asia, Western Pacific, Eastern Mediterranean, and South America, *P. vivax* malaria is responsible for severe malaria among pregnant women (48). Studies using *P. vivax* Duffy Binding Proteins (PvDBP) suggest the possibility of using PvDBP for the development of a vaccine against *P. vivax* malaria (49).

Socio economic status

Malaria disproportionately affects 58% of the world's poorest 20% (50). In a study of maternal malaria and socioeconomic status that used absence of electricity as an indicator, the authors found an associated increased risk of malaria in pregnancy (21). One would argue that in many rural and peri-urban regions in low income countries, electricity is a publicly financed infrastructure which may not be a valid indicator of socioeconomic status at the individual and household levels. Brentlinger et al (18) working in central Mozambique, independently arrived at the same conclusion regarding the relationship between socioeconomic status and malaria prevalence. They found that the unavailability of electricity, absence of running pipe-borne water and dirt-floor housing were predictors of malaria parasitemia among pregnant women. In most African countries, women have limited economic power. When they are ill, they rely on the husband to provide resources to initiate therapy. The funds for this may not be readily provided, thus leading to a delay in seeking care (25). This delay is compounded by poor knowledge about signs and symptoms that may be indistinguishable from those witnessed in early pregnancy (44). Though no study has explored the effect of malnutrition on malaria susceptibility, like malaria, maternal nutrition shows the same seasonality as malaria (40) with more cases of malaria occurring during the rainy season when the previous farming season's crops have been exhausted (51).

Brentlinger et al (18) in their study in Mozambique, demonstrated a significant association between lack of education among pregnant women and malaria parasitemia, OR=1.38 (95% CI=1.15-

1.66). As would be expected, mothers who with higher levels of education were likely to be of higher socioeconomic status compared to those without formal education. They were likely to eschew activities that would potentially increase their susceptibility to malaria (52) and were more likely to attend prenatal care services (53). This study lends credence to earlier studies that associate higher rates of bednet use among individuals with superior educational exposure (51). Pregnant women with formal education tend to be better informed and are likely to participate in community efforts to control the vector e.g., proper refuse disposal and even community organized insecticide spraying.

HIV infection

The burden of malaria in pregnancy is exacerbated by co-infection with HIV. Because of an altered state of the immune system, HIV positive patients are more vulnerable to the malaria parasite (23). There is a higher prevalence of malaria in HIV+ pregnant women compared to HIV- women (RR=1.7, CI= 1.52-1.90, P<001) (21); there is also an increase in the density of parasites in blood (P=0.0005) (15). These observations are responsible for the higher prevalence of febrile episodes, and chronic parasitemia in pregnant women living with HIV/AIDS (27). HIV infection also reduces the protective effect of higher gravidity on malaria (23). Van Eijk (21) found that HIV-positive young multigravidae had a two-fold increased probability and young HIV-seropositive primigravidae had more than three-fold increased probability of parasitemia. HIV infected mothers also demonstrate less benefit from intermittent preventive therapy with SP to prevent malaria compared to HIV seronegative women (54).

Conclusions

It is possible that there are a plethora of socio-demographic factors other than the ones discussed in this study that influence malaria among pregnant women. Our review focused on the 19 studies that were judged to be of good enough quality to permit rational evidence-based conclusions. Overall, the key

message of this review is that while it is known that all pregnant women in malaria endemic regions are predisposed to the dangers of malaria, some are at greater risks than others as a result of their varying exposures to different socio-demographic factors. We hope that with a holistic view of these determinants, program planners can prioritize the deployment of resources to reduce the impact of malaria among pregnant women and devise new strategies for reaching those at the greatest risk, particularly primigravidae, adolescents and young adults, the poor and rural dwellers. For them, WHO's recommended triad of insecticide treated bednets, intermittent preventive therapy and decisive case management of malaria in pregnancy is still a fantasy reserved only for the few that traditionally have unfettered access to prenatal services.

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Original Articles

The effect of development of problem-solving skills on the depressive symptoms in women in a primary care setting in Turkey

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Abstract

The aim of this study was to investigate the effect of developing problem-solving abilities on depressive symptoms of women in primary care settings. Study subjects consisted of women with complaints of physical health problems not caused by a well-defined medical disease. The study was performed on 76 women randomized into the study group (n = 38) and controls (n = 38). The data of the research were obtained by using the interview form, Beck Depression Inventory and Problem-Solving Inventory at baseline and three and six months later. The study group and controls were comparable with regard to demographic data ($p > 0.05$). Depression and problem-solving scores of the study group and controls were comparable at baseline ($p > 0.05$). Overall, depression and problem-solving scores of the study group were significantly lower than those of the controls ($p < 0.05$). In the study group, depression and problem-solving scores at month 6 were significantly lower than those at baseline and month 3 ($p < 0.05$) and depression and problem-solving scores at month three were significantly lower than those at baseline ($p < 0.05$). In the control group, there were no significant differences in depression and problem-solving scores measured at baseline and three and six months later ($p > 0.05$). The findings of our study demonstrated that with increase in problem-solving abilities of women, the depressive symptoms decreased. In primary care settings, there is need to implement programs to increase problem-solving skills of women, who have physical symptoms such as gastrointestinal, reproductive and neurologic symptoms in order to decrease depressive symptoms.

Keywords: Depression, problem solving abilities, women, nursing, primary care settings.

Introduction

Depression is the most common mental health problem. It has been reported that prevalence of

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depressive symptoms in the society is between 13-20% (1-3). The cost of depression to society is considerably due to lost ability to work, participate in society and increased frequency of visits to physicians and high-cost medical-diagnostic testing (4,5). Women are two to three times as likely as men to be depressed regardless of race, income, or education (4,6). Furthermore, women have twice the risk for unreported and unacknowledged depression (6,7).

A number of explanations have been forthcoming, as for example, that marriage has a less protective effect for women than for men. Such factors as the absence of relationships or partnership supporting women, the presence of little children for them to look after, and the lack of work or something to occupy them outside the home make them inclined towards depression (4,6-9). Also important is the assumption that female hormones lead to depression biologically. The changes that appear in the hormones in the menstruation cycle in particular leads to such feelings as tension, touchiness and restlessness. This state, in turn, increases the inclination towards depression (6).

The existence of depressive symptoms significantly affect quality of life (10-13). By making these individuals with depressive symptoms deal with problem solving skills, one may improve coping skills, thus leading to a decrease in depressive symptoms, thus impacting their life in a positive manner (12-14).

Effective skills for solving interpersonal and social problems encountered in everyday life are considered vital to personnel well-being. Studies have revealed that the problem-solving abilities in individuals with depression are destroyed or deteriorated (15-22). Some authors have defined the problem as a difficult situation in which the individual does not have the necessary performance abilities or as a situation in which he or she is not ready for an answer, while others have defined it as the absence of an open way to a purpose or as an obstacle or by-road. It is supposed that a problem arises when there is a difference between the real and ideal states of the events and when the individual fails to adapt himself or herself to a state quickly and to meet a requirement. The solution is reaching the target or fulfilling the purpose through a series of actions (20,22-24). The individuals in depression determine the fields of

problems, but have difficulty in solving these problems (20,22).

Problem solving training can be implemented as a preventive measure and integrated into everyday life. In a study by Dowrick et al (16) problem-solving abilities of the group with depression were found 17% lower than those in the control group and following a one-year education and follow-up, no significant differences was found with another group given anti-depressants. In a study done by Katon et al (5) to prevent the relapses of depression in primary care, it was determined that relapses of depression were fewer in the group, where problem-solving therapy was applied (5). Meade et al (1) stressed that the problem-solving approach along with anti-depressant treatment in primary care made a great contribution to the individuals organizing their lives (1). Ludman et al (25) showed that depression could be prevented by using the methods of improving the decision-making abilities and cognitive-behavior methods and found that 62% of these patients do not need any drug treatment (25).

It is a known fact that women tend to go to primary care setting more often than men with the explanation that their physical complaints often are due to their repression and personalization of their own feelings and thoughts (9,26,27). Because the treatment is directed towards physical problems, depression is often overlooked or under-diagnosed (7,9,26). However, depressive symptoms may be reduced and a better life standard secured, if nursing practices are implemented to enhance problem-solving abilities in order to combat hopelessness, helplessness, reluctance, worthlessness, loss of meaning and significance of life. It has been remarked in several studies that nurses trained to develop problem-solving abilities can apply this treatment to the individuals with emotional disturbances and this approach can be effective in the primary care of depression (21,28,29). It is therefore considered important for the protection and improvement of public and individual health that women with depression should be recognized by nurses in the primary care setting.

The aim of this study was to assess the effect of the problem-solving approach on depressive symptoms in women coming to health centers with

complaints of physical health problems not caused by a well-defined medical disease.

Methods

This study used the pre- and post test controlled-group experimental model. The participants consisted of 76 women, whose score was greater than 12 on the Beck Depression Inventory (BDI) (30). All had a risk of depression; but without exhibiting major depression symptoms; none of them were receiving pharmacologic or psychotherapeutic treatment, all were literate and consented to participate in this study.

Procedure

The research was carried out at a primary care setting after the required permission and consent was achieved. The women who applied to this health centre with physical health problems formed the sample for the research. Meeting the criteria of admission to the research by the simple randomized sampling method, the women were determined as the study group and controls. The women who applied to the health centre during a whole day were given numbers according to the order of their treatment; thus, the women with an odd number were included in the study group while the ones with an even number were controls. The sample consisted of 76 women, 38 in the study groups and 38 in the controls on the basis of a 0.05 error level and .85 power value.

Criteria for admission

The women admitted to the research were expected:

- To have a grade between 12 and 45 from Beck Depression Inventory (those with a grade equal to or higher than 25 were asked to be evaluated by a psychiatrist)
- To have no suicidal thoughts and ideas (those with such thoughts were sent directly to see a psychiatrist)
- Not to have a well-defined or diagnosed physical or mental illness
- Not to be pregnant or not to have delivered a baby in recent times
- To have graduated from a primary school at least
- To have no communication disability
- To be between the ages of 18 and 45 years and not to be in the menopause period.

Seeing that each of the women had a different familial environment, a distinct personality and different facilities, it was assumed that the subjects included in the study would be influenced by these conditions in similar ways.

The interviews were carried out at the primary care setting. The interviews were conducted, where the women could feel comfortable and at ease without noise or disturbance. The women who met the required criteria and agreed to participate were randomly sampled as the study group and controls in the order of their visit to the primary care setting. Each woman was interviewed face to face in a session that lasted for about 45 minutes. The women in the study group were given the program of developing problem-solving abilities in ten sessions (450 minutes in sum). They were called back for observations three and six months later (90 minutes in sum). The women in the control group were, however, interviewed in three sessions and each session lasted for 30 minutes (90 minutes in sum). They were also called back for observations three and six months later.

Hypotheses of the research

We formulated the following hypotheses for our research:

- There is a difference between the pre-approach depressive symptom level faced by the women to whom the program of developing problem-solving abilities was applied and their post-approach depressive symptom level.
- There is a difference between the depressive symptom level faced by the women to whom the program of developing problem-solving abilities was applied and the depressive symptom level faced by the women to whom

the program of developing problem-solving abilities was not applied.

- There is a difference between the pre-approach problem-solving abilities of the women to whom the program of developing problem-solving abilities was applied and their post-approach problem-solving abilities.
- There is a difference between the problem-solving abilities of the women to whom the program of developing problem-solving abilities was applied and the problem-solving abilities of the women to whom the program of developing problem-solving abilities was not applied

Intervention

Women in this study group were taught problem solving skills by the nurse researcher. Training was carried out according to the principles of D’Zurilla and Goldfield (31). In the initial D’Zurilla and Goldfried formulation, problem solving was characterized by five general stages (31):

- Problem orientation stage (sessions 1-2) to reduce or distract attention from negative emotional states and thoughts (self statements) that disrupt problem-solving and focus instead on the stimulus of these negative responses
- Problem definition and formulation (sessions 2-3) to identify a realistic goal or objective for problem solving
- Generation of alternatives (sessions 3-4) using a brain-storming method, to make available many solution alternatives
- Decision making (sessions 5-8) to evaluate to consequences of available solution alternatives and select the most effective one for short and long term, personnel and social reasons
- Solution implementation and verification (sessions 9-10) to verify the efficacy or outcome of the chosen solution in real life.

Sociodemographic questionnaire

The form prepared by the researcher with reference to literature is composed of the parts formed to determine the demographic qualities of the individuals included in the research, their existing and potential problems, their thoughts and responses about them, their level of awareness, the factors that may affect their problem-solving abilities and the stages of problem solving (22,23,32,33).

Beck Depression Inventory

Beck Depression Inventory (BDI) was developed by Beck and associates in 1961 and translated into Turkish by Tegin (1980). The BDI is a 21 item forced-choice questionnaire. The BDI is commonly used to measure a person’s depressive symptoms by surveying several areas including emotional states, relationships with others, physical indices of depression (e.g., loss of appetite, change in amount of sleep needed, change in body weight), performance on daily task, and outlook toward the future. The total score ranges from 0 to 63. Although the BDI is not a diagnostic scale, it has been often used for indicating the level of depression and depression. The BDI has had high internal consistency, with alpha coefficients of 0.86 and 0.81 for psychiatric and nonpsychiatric populations, respectively. Reported split-half reliability for the BDI was 0.74 a Turkish population (30). In this study, split-half reliability coefficient was 0.75.

Problem Solving Inventory

Problem Solving Inventory (PSI) was developed by Heppner and Petersen in 1982 is a tool of determining the stages of problem-solving process and evaluating the individual thoughts about own problem-solving approaches and attitudes. The inventory can be used in determining the way the individual solves or copes with his or her problem in fields of psychological guidance, medicine and education. The inventory is easy to use and score. There is no time limit in answering, but the average time of answering is 15 minutes. The inventory consists of 35 items of 6-point

likert type. In the inventory, "1" means "I completely agree." while "6" means "I completely disagree." A low score is indicative of efficiency in problem-solving and behavior and attitudes towards success in problem-solving. A high point, however, is tantamount to the failure to find effective solutions to problems. The adaptation of the inventory to Turkish and studies on its reliability and validity were carried out by Taylan (1990). The results obtained from the versions of the inventory in both languages have shown that both forms are quite equivalent (30). That the reliability score obtained in the present research is .99 shows that the inventory is a reliable tool for the study.

Statistical analysis

Data were presented as mean \pm SD and number (percentage). Demographic data were analyzed with chi-square test. Depression and problem-solving scores were compared with repeated measures ANOVA followed by post hoc Tukey test. A p value of <0.05 was considered as statistically significant.

Results

Table 1 presents age groups, marital status, education level, profession, economic status, marriage type, marriage duration, husband's education, family structure, and child number. The study group and controls were comparable with regard to demographic data ($p > 0.05$).

Figures 1 and 2 show depression and problem-solving scores measured at baseline and three and six months later of the study group and controls. Depression and problem-solving scores of the study group and controls were comparable at baseline ($p > 0.05$). Overall, depression and problem-solving scores of the study group were significantly lower than those of the controls ($p < 0.05$). In the study group, depression and problem-solving scores at month 6 were significantly lower than those at baseline and month 3 ($p < 0.05$) and depression and problem-solving scores at month 3 were significantly lower than those at baseline ($p < 0.05$). In the control group, there were no significantly differences in depression

and problem-solving scores measured at baseline and months 3 and 6 ($p > 0.05$).

Discussion

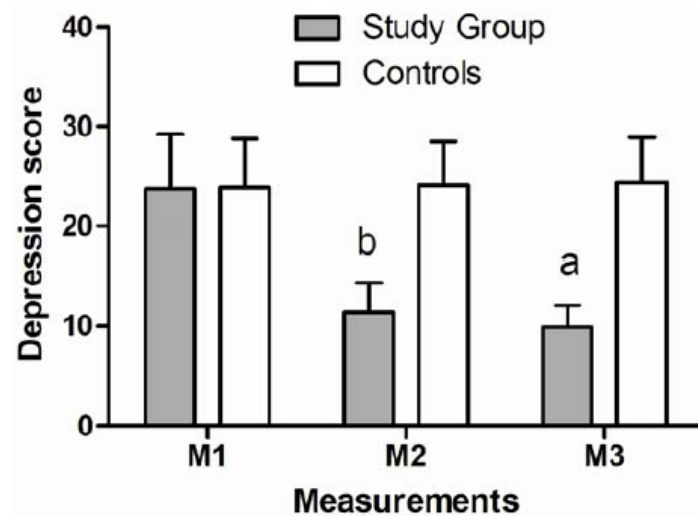
To the authors' knowledge, this study is the first nursing intervention study to reduce the prevalence of depressive symptoms for women in Turkey. Our results indicate the importance of receiving nursing training for depressive symptoms. The finding of the study supported our hypothesis that problem solving training decreased depressive symptoms. Depression is widely and frequently seen in societies and leads to a considerable loss of ability, pain and suffering to the family and society. Nevertheless, it is underdiagnosed and women visit the primary care setting more frequently than men do but they tend to attribute their complaints to physical symptoms. However, when a group of women who visit the primary care setting with such complaints as ache, vomiting and nausea though without any physical health problem are examined in details, it appears that they are unable to solve their problems and have difficulty expressing their feelings. Moreover, there is some sort of prejudice against the use of anti-depressants in the society, since people are of the opinion that such drugs will lead to addiction. Therefore, it seems essential that women be strengthened with another method than drugs and enabled to cope with depression. It is thought that developing women's problem-solving abilities will enhance their power of coping with the problems and thus prevent depression from becoming chronic (16,17).

In our study, women were chosen with the random sampling method. The women in the study group and controls were similar with regard to demographic data. The study group and controls were comparable at baseline with regard to the depression and problem-solving scores. Overall, depression and problem-solving scores of the study group were lower compared to the controls. In the study group, the depression and problem-solving scores at month six were lower than those at baseline and month three. In the controls, the depression and problem-solving scores were similar measured at baseline and three and six months later.

Table 1. Demographic data

	Study group n (%)	Controls n (%)	P ^a
Age groups (y)			
18-26	9 (23.6)	9 (23.6)	p>0.05
27-35	12 (31.5)	15 (39.5)	
36-45	17 (44.9)	14 (36.7)	
Marital status			
Married	20 (52.6)	19 (50)	p>0.05
Single	9 (23.7)	10 (26.3)	
Widow/Divorced	9 (23.7)	9 (23.7)	
Education level			
Primary	15 (39.5)	17 (44.7)	p>0.05
Secondary	14 (36.8)	13 (34.2)	
University	9 (23.7)	8 (21.1)	
Profession			
House wife	12 (31.6)	13 (34.2)	p>0.05
Cleaning service	6 (15.8)	5 (13.2)	
Children care	5 (13.2)	5 (13.2)	
Clothing industry	8 (21.1)	7 (18.4)	
State official	7 (18.4)	8 (21.1)	
Economic status			
Low	22 (57.9)	22 (57.9)	p>0.05
Medium	11 (28.9)	10 (26.3)	
Good	5 (13.2)	6 (15.8)	
Duration of marriage			
1-5 years	4 (20)	5 (26.3)	p>0.05
6-11 years	6 (30)	6 (31.6)	
12-17 years	10 (50)	8 (42.1)	

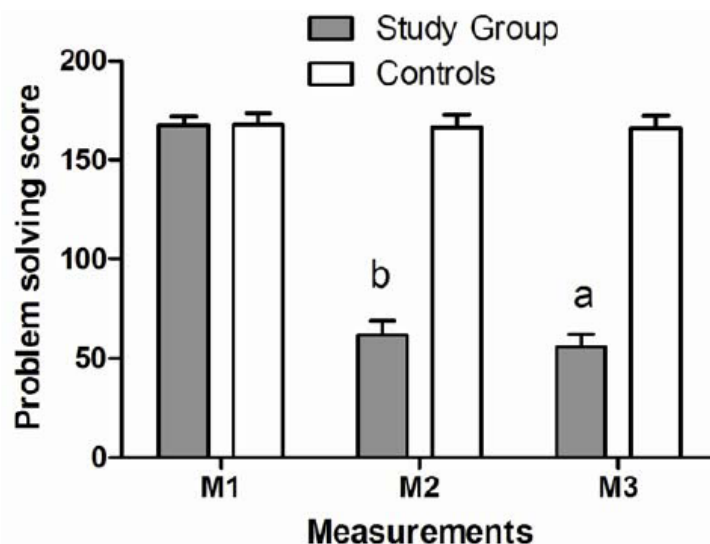
^aChi-square test.



^aP < 0.05 vs. M1 and M2.

^bP < 0.05 vs. M1.

Figure 1. Depression scores measured at baseline and months 3 and 6 of study group and controls. M1, baseline; M2, at month 3; and M3, at month 6.



^aP < 0.05 vs. M1 and M2.

^bP < 0.05 vs. M1.

Figure 2. Problem solving scores measured at baseline and months 3 and 6 of study group and controls. M1, baseline; M2, at month 3; and M3, at month 6.

These findings demonstrated that as problem-solving score increased, depression scores decreased. However, there was no change in the problem-solving and depression scores in the control group.

Cannon and Millar (15), who applied the problem-solving program to 15 patients with depression, reported that the BDI score, which was between 27.6 and 31.5 before the program, decreased considerably after the program and the women who had had suicidal ideas got rid of such thoughts. Wallis et al (34) reported that treatment of developing problem-solving abilities was as effective as anti-depressants, more effective than placebo and more accepted by the patients. In their study on 91 randomly chosen patients, they found a significant difference between the patients to whom treatment of developing problem-solving abilities was applied and those who were given placebo as regarding their depression scores, whereas there was no significant difference between the patients to whom treatment of developing problem-solving abilities was applied and those who were given amitriptyline. As a result of the program of developing problem-solving abilities for 3,5 hours over 12 weeks totally, the patients expressed their satisfaction with the program and applications (34).

Walling (22) stressed that depressive disorders were a significant cause of morbidity and satisfactory

results can be obtained in a primary care setting and prevent the illness becoming chronic. It is reported that treatment is usually done with drugs in the primary care of depression, but patients' adaptation to the drugs is not satisfactory. It is also stated that 41% of the patients stop using the drugs within two weeks after they are given the drugs and 68% within four weeks (22). Researchers, therefore, emphasize that alternative different methods ought to take the place of drug-treatment. It is remarked that especially in the program of developing problem-solving abilities, they have learned to cope with their existing problems effectively by using their own abilities and they feel safe about the way they will solve any problem they may face in the future (16,20,34).

In their randomized control study Munos et al (35) applied the program of problem solving to 150 primary-care patients with a low socio-economic level from rural areas and found that depression level decreased to a large extent. Dowrick et al (16) carried out a multi-center randomized control study to determine the acceptability of group psycho-training and program of problem solving for depression and the effect of these applications on their diseases and lives. In this study, 452 subjects were chosen as the sampling group; 128 of them were given problem-solving program and 108 were trained on preventing

depression; 189 were, however, included in the control group.

The scores taken six months later from BDI by the patient group to whom problem-solving program was applied were seen to have decreased significantly and problem-solving program was more acceptable and effective than the other programs. Mischoulan et al (33) carried out a study on 40 patients, 36 female and 4 male, with a BDI score higher than 16 by using BDI and PSI and found that level of depression had decreased following the three-month-long treatment.

Researchers (20,21,28) also stress the significance that problem-solving program is short and acceptable, adding that the other applications are longer and more time-consuming as well as more expensive.

It is emphasized, however, that duration of application may as well vary, depending on such factors as motivation and educational level and depression level of the group treated.

The findings obtained from our research indicated that the program of developing problem-solving abilities can be used as a very effective method in reducing the depressive symptoms. As depression is the most frequently and commonly observed disease in the society and costs a lot to the individual, family and society, it is a public health problem to be dealt with seriously. Nursing is, on the other hand, an important health discipline in improving the health and preventing the illnesses (32,34).

It is thought that especially the nurses working in the units for public health can develop women's problem-solving abilities and thus prevent the emergence of depressive symptoms.

Conclusions

The findings of our study suggested that if the problem-solving abilities of women are developed, their depressive symptoms will be decreased. In primary care settings, there was need to conduct programs to increase problem-solving skills of women who have physical symptoms such as gastrointestinal, reproductive, and neurologic symptoms and who have depressive symptoms.

Acknowledgements

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How well do parents in the United States report heights and weights for children?

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Abstract

Parent-reported values for children's heights and weights are routinely collected in national, state, and school surveys in the United States. Our purpose was to examine the accuracy of those values for children 2–11 years old. Z scores, means and standard errors, paired t-tests and Spearman rank order correlations were calculated for three age and three ethnic groups to estimate reliability and validity of values. Few parents accurately reported their child's height, weight, and calculated BMI (15.0%, 13.7%, and 5.6%, respectively). Many parents responded 'Don't know' to questions about their children's weight (25%) and height (53%). The typical parent of 2-5 years olds under-reported height by about 4.6 cm. The magnitude and direction of the BMI bias or error for 2-5 years olds was +2.3 BMI units. The decreasing relative bias for height and BMI indicated increasing accuracy as children age. Height and BMI bias was greatest for children in the 2-5 year group; here, the sex-specific bias for non-Hispanic black and Mexican-American boys and girls exceeded the bias for non-Hispanic white preschoolers ($p = 0.05$). Regarding random error, the coefficients were smaller for height compared to weight indicating that height was a greater source of this error. For clinical and public health environments, use of parent reports introduced random and systematic errors to reported heights and weights particularly height and calculated BMI. The magnitude and direction of the errors varied by child's age and ethnicity.

Keywords: Height, weight, BMI, overweight, children.

Introduction

Reported values of height and weight for children are often collected from parents or caregivers as part of national, state and school surveys in the United States, where time, money, and/or expertise are not available to measure these variables (1). In our search of the literature, only two validation studies of parent or caregiver reports of heights and weights for children

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were found (2,3). One study reported on the accuracy of parent reported values for Mexican-American 6 mo-11 year old children (3). The second study included 150 parent reports of weight for their obese children (6-11 years), who were participating in a weight control/reduction program (2). With extensive collection of reported values to monitor population trends in weight (and particularly BMI), to monitor individual children by public schools, and in using BMI in chronic disease related studies, it is important to determine the accuracy of this method of estimating children's actual heights and weights.

To our knowledge, this report is the first large-scale analysis of the accuracy with which parents and caregivers in the United States reported their children's height and weight. We examined the relationships of reported and measured heights, weights, and the corresponding calculated BMI using a nationally representative sample of children [n = 7,316]. We assessed both the prevalence of parents or caregivers reporting children's heights and weights accurately as well as the magnitude and direction to which population estimates are biased for sub-groups of children (ie, validity) and the parameters' variance (ie, reliability). Subsequent references to parents in this paper refer to both parent and caregiver respondents.

Methods

The Nutrition and Health Examination Survey (NHANES) III dataset (1989-94) was selected, because this survey collected both reported and measured height and weight for children and was designed to obtain a nationally representative sample of the US civilian population by employing a complex, stratified, multistage, probability cluster sampling design of partial probability samples of households in 48 contiguous states (4). Procedures were reviewed and approved by the University of California, Davis, Institutional Review Board.

During interviews conducted in their homes, parents and caregivers were asked to estimate their children's height and weight (reported height and weight); BMI was calculated based upon these reports. Approximately 99% of the children subsequently were measured (measured height,

weight, and calculated BMI) in the Mobile Examination Center (MEC) (5).

Variables

Ten age-years, two sex categories and three ethnic groups in the original analyses generated 60 permutations for weight and 60 for height. A sample size of 30 per cell was estimated to adequately detect correlations and 40 per cell to adequately compare means for each of the 120 age-sex-ethnic groups. To have sufficient sample size, NHANES III datasets from the years 1989-1991 (phase 1) and 1991-1994 (phase 2) were combined.

Reported height and weight. Parents reported values for height and weight for their children during the household interview.

Measured height and weight. Trained health technicians measured children at the MEC using procedures described elsewhere (4,5).

Body mass index (BMI, kg/m²). The term measured BMI refers to the body mass index calculated from children's measured height and weight. The term reported BMI is calculated from parent-reported values for children's height and weight.

Age, gender and race/ethnicity. Children were originally grouped into ten 12-month age categories and then collapsed into three for the reader's convenience. Data from three ethnic/racial (non-Hispanic white, non-Hispanic black, Mexican-American) and two gender groups were examined.

Statistical analysis

Using Stata (6), sample weights accounted for the unequal probabilities of selection, oversampling, and non-response (5). Using the CDC growth charts, Z scores were calculated for weight-for-age and height-for-age (7). Outliers were defined as ± 4 SDs for height- and weight-for-age Z scores, and removed to correct biological infeasibility, recording error, or coding error. For parent-reported values, extreme values were not removed from analyses.

Using each child's birth date, date of the MEC visit, and date of the interview, age in months for the interview and for the MEC was determined (5).

As there was no established guideline to follow, acceptable accuracy of reported values was defined as $\pm 2\%$ of the corresponding measured values. For example, a reported height for an arbitrary 3-year old child measured at 102 cm. would be considered accurate within a range of 100 to 104 cm. Accuracy (ie, validity) of the reported values (8,9) was estimated from the mean of the differences between measured values for the population (also called the bias or systematic error) for height, weight, and calculated BMI. The bias of sub-groups were compared to determine if the direction of the bias varied between the groups. The differences between reported and measured values relative to the corresponding measured value $[(\text{reported} - \text{measured}) / \text{measured} \times 100]$ was termed "relative bias". Analyses of mean relative bias were used to assess which component of BMI (weight, height, or both) was responsible for the observed pattern in the subgroup analyses. Paired t-tests were used to evaluate the significance, if any, of the bias (8,9).

Reliability of reported values was assessed by the Spearman rank-order correlation coefficients (9). Group differences in random error were assessed by comparing the variances of the bias between groups, while the differences in bias (ie, indicating differences in validity) were assessed by testing for statistically significant differences in magnitude of mean errors between groups using t-tests and a weighted analysis of variance. Test statistics associated with chance probabilities of 0.05 or less for Type I errors were considered statistically significant.

Results

When asked, parents had a 53% probability of responding "Don't know" for height and a 25% probability for weight. One of the reported height or weight variables was missing for 55% of the children ($n = 4,023$). Consequently, children with reported height and weight values to calculate BMI numbered 3,293 (see table 1). The mean age of the 4,023 children for whom BMI pairs were unavailable was younger in comparison to the mean age of the 3,293

children with available BMI pairs (mean age = 5.4 years and 5.8 years, $p = 0.001$) (data not shown). Children without available BMI pairs were more likely to live in households with lower incomes (68%) compared to children with available BMI pairs (50% low income households) ($p = 0.04$) (data not shown). The mean measured weight of the 3,293 children in the final sample was 27.7 kg (SE .29) and statistically different from the measured weight of 24.9 kg (SE .29) for the 4,023 children lost to exclusion criteria ($p < .0001$) (data not shown). The mean measured height of the 3,293 children in the final sample was 123.5 cm (SE .58) and statistically different from the measured height 118.7 cm (SE .64) of children who did not meet exclusion criteria ($p < .0001$).

Prevalence of accurately reported values

Of the parents of 5,457 children with measured weights in the original sample, 20.1% reported their child's weight within $\pm 2\%$ of the measured weight (see table 2). Of the 3,410 parents reporting heights (47%) in the original sample, 29.5% reported their child's height within $\pm 2\%$ of the measured height. Including those reporting "Don't know," only 13.7% (1,005/7,316) accurately reported weight and 15.0% (1,095/7,316) accurately reported height. Of these 7,316 children, 5.6% ($n = 409$) had an accurately estimated BMI based on reported values (see table 2).

Bias in reported values

The direction (ie, negative sign) of the computed bias for height and weight for each of the three age categories indicated under-reporting of the measured values (see table 3). For example, the typical parent of 2-5 years olds under-reported height by about 4.6 cm and weight by about 0.2 kg. Relative to the measured value, the relative bias for weight was small (0.5% of measured weight) while the relative bias for height was large (4.6% of measured height). The bias in reporting for children's height tended to be larger for younger compared to older children.

Table 1. Inclusion and exclusion criteria and sample size for the combined sample of children, 2-11y, in NHANES III Phase 1 (1989-1991) and Phase 2 (1991-1994)

Description	Lost (n)	Sample remaining (N)
Initial sample size, age 2-11 y †	540	7,981
Other ethnic/racial group		7,441
Measured weight-for-age outliers ‡	15	7,426
Measured height-for-age outliers ‡	3	7,423
Both measured height and weight available	107	7,316
Reported height and weight	4,023	3,293
Weight pairs (5,457)		
Height pairs (3,410)		
Measured and reported values for BMI (4 values available) ††		3,293
FINAL SAMPLE		3,293‡‡

† All subjects with reported ethnicity. Children, other than non-Hispanic white, non-Hispanic black and Mexican-American, were excluded.

‡ Based on ± 4 SDs of the measured value. Reported and measured value is available. Figure transferred to Table 2.

†† Measured height and weight, and reported height and weight available in same child for BMI calculations.

‡‡ Includes 1,831 2-5 y olds, 620 6-8 y olds, and 842 9-11 y olds with 1628 boys and 1665 girls.

Table 2. Prevalence (%) of parents/caregivers reporting accurately the heights, weights, and BMI for children, 2-11 y.^a

	Accurately reported values prevalence (%)					
	Reports of "Don't know" excluded			Reports of "Don't know" included n=7,316		
	Height n= 3410	Weight n= 5457	BMI n= 3293	Height	Weight	BMI
Age						
2-5y	24.8	20.0	11.5	11.1	15.3	5.0
6-8y	29.2	18.9	10.7	12.5	13.1	4.4
9-11y	39.6	21.1	15.8	22.0	15.8	8.4
All	29.5	20.1	12.4	13.7 ^b	15.0 ^c	5.6 ^d

^a Accuracy is defined as $\pm 2\%$ of the measured value. Accuracy rate = percent (%) of parents/caregivers reporting within $\pm 2\%$ of the measured value.

^b [1,005 children with reported height $\pm 2\%$ of measured height] divided by [3,410 children with reported height + 3,906 children with reported "Don't know"]

^c [1,095 children with reported weight $\pm 2\%$ of measured weight] divided by [5,457 children with reported weight + 1,859 children with reported "Don't know"]

^d [409 children with reported BMI $\pm 2\%$ of measured BMI] divided by (3,293 children with reported BMI + 4,023 children with reported "Don't know")

Table 3. Measured (M) and reported (R) values, mean errors (bias), absolute value of the error for height, weight, and BMI by age category using data from NHANES III, 1988 – 1994^{†‡}

Age (y)	Mean (cm)		Height n = 3,410			
	M	R	Error mean (\pm SE)			
			Bias	Relative bias (%)	Mean absolute error	Mean relative absolute error (%)
2-5	102.32	97.67	-4.64 (0.30) **. ^a	-4.60 (0.29) ^a	7.21 (0.26) ^a	7.07 (0.25) ^a
6-8	125.89	121.69	-4.21 (0.49) **. ^a	-3.33 (0.39) ^b	7.17 (0.43) ^a	5.73 (.35) ^b
9-11	144.59	141.65	-2.94 (0.46) **. ^b	-2.07 (0.33) ^c	5.71 (0.32) ^b	4.01 (.23) ^c

Weight (kg) N =5,457						
Age (y)	Mean (kg)		Error mean (\pm SE)			
	M	R	Bias	Relative bias (%)	Mean absolute error	Relative absolute mean error (%)
2-5	16.80	16.65	-0.15 (0.05) *, ^a	-0.54 (0.32) ^a	1.23 (.04) ^a	7.35 (.24) ^a
6-8	26.84	26.10	-0.74 (0.16) **, ^b	-2.16 (0.51) ^b	2.25 (0.14) ^b	8.21, (.43) ^b
9-11	39.60	38.19	-1.41 (0.22) **, ^c	-2.75 (0.47) ^b	2.88 (0.18) ^c	7.13, (.37) ^a
BMI (kg/m ²) n = 3,293						
Age (y)	Mean (kg/m ²)		Error mean (\pm SE)			
	M	R	Bias	Relative bias (%)	Mean absolute error	Relative absolute mean error (%)
2-5	15.98	18.28	2.30 (0.19) **, ^a	14.47 (1.17) ^a	3.32 (0.19) ^a	20.73, (1.12) ^a
6-8	16.64	17.75	1.11 (0.23) **, ^b	7.23 (1.29) ^b	2.63 (0.19) ^b	15.54, (1.07) ^b
9-11	19.04	19.41	0.37 (0.14) *, ^c	3.08 (0.75) ^c	2.10 (0.16) ^c	11.20, (0.80) ^c

† Parent reported for child. Mean bias = mean of reported value minus measured value (reported – measured) for all children in the group and represents the strength and direction of the population mean. Relative mean bias = (bias ÷ measured value) x 100. Mean total error = absolute value of reported height, weight or BMI minus measured value calculated for each individual and then averaged for the population and represents the mean of the absolute bias for each individual. Relative total error = (error ÷ measured value) x 100.

‡ Paired t-test to determine if mean bias (reported minus measured value) is significantly different from zero. Sample weights accounted for the unequal probabilities of selection, oversampling, and non-response.

*p ≤ 0.01; ** p ≤ 0.001 ^{a, b, c} Groups sharing common superscript are not significantly different from each other (p ≤ 0.05).

As a result, relative bias for BMI was larger for the youngest age categories. The BMI bias for 2-5 year olds was +2.3 BMI units or 14.5% of BMI based on measured values. Unlike the negative bias for height and weight, BMI bias was positive. For each age category, the relative bias for BMI was larger than that for weight and for height (see table 3). The decreasing relative bias for height and BMI indicated increasing accuracy as children age; ie, as children approach puberty, parents are more likely to estimate heights and resultant BMI with more accuracy. The relative bias for BMI was largely explained by height bias as height is squared in the denominator of the BMI calculations.

Height and BMI bias was greatest for children in the 2-5 year group (see table 4); here, the sex-specific bias for non-Hispanic black and Mexican-American boys and girls exceeded the bias for non-Hispanic white preschoolers (p = 0.05). Weight bias (not shown) was relatively small compared to height and BMI bias for each age, sex, and ethnic category.

Extreme bias. Extreme bias in reporting was defined as ± 4 SD of the reported value. Numerous parents made extreme errors in reporting their children’s height while only a small number made extreme errors in reporting their children’s weight. Specifically, about 16% of parents (531 of 3,410 with reported height available) reported extreme values for height for their children while 1% (57 of 5,457 with reported weight available) reported extreme values for weight.

Random error in reported values

As another indicator of accuracy, we calculated the Spearman correlation coefficient (ie, reliability coefficient) for reported and measured values for height, weight, and BMI derived from those reports or measurements. The coefficients were consistently smaller for younger children (2-5 year olds: r = 0.66 height, 0.84 weight, 0.30 BMI) indicating less

reliability and more random error in the reported heights and weights compared to older children (6-8 y olds: $r = 0.50$ height, 0.83 weight, 0.41 BMI; and 9-11

year olds: $r = 0.73$ height, 0.90 weight, 0.61 BMI). This result implies that randomness of the error is age-dependent.

Table 4. Comparison by race/ethnicity and gender for 3 age categories for height and BMI bias for reported values using NHANES III, 1988 – 1994^{†‡}

Height bias (cm) (mean ±SE) n = 3,410						
Age	Non-Hispanic White		Non-Hispanic Black		Mexican -American	
	Boys	Girls	Boys	Girls	Boys	Girls
2-5 y	-3.5 (0.6) ^a	-3.6 (0.5) ^a	-8.5 (0.9) ^b	-7.6 (1.1) ^b	-8.4 (0.8) ^b	-9.3 (0.8) ^b
6-8 y	-3.7 (0.8) ^a	-3.8 (0.7) ^a	-4.9 (2.0) ^a	-6.6 (2.2) ^a	-6.6 (1.3) ^a	-5.7 (1.6) ^a
9-11 y	-1.9 (0.7) ^a	-2.5 (0.7) ^a	-1.4 (1.5) ^a	-4.8 (1.2) ^{a,b}	-6.2 (1.0) ^b	-7.1 (1.0) ^b
BMI bias (kg/m ²) (mean ±SE) n = 3,293						
Age	Non-Hispanic White		Non-Hispanic Black		Mexican –American	
	Boys	Girls	Boys	Girls	Boys	Girls
2-5 y	1.8 (0.3) ^a	1.6 (0.3) ^a	4.5 (0.6) ^b	4.2 (0.9) ^b	4.7 (0.6) ^b	4.9 (0.5) ^b
6-8 y	0.8 (0.4) ^a	0.8 (0.3) ^a	2.4 (0.9) ^{a,b}	2.6 (0.9) ^b	2.9 (0.7) ^b	1.8 (0.7) ^{a,b}
9-11 y	0.4 (0.2) ^a	0.0 (0.3) ^a	0.5 (0.6) ^{a,b}	0.2 (0.5) ^a	1.4 (0.4) ^b	1.1 (0.5) ^a

[†] Mean (±SE.) Bias is defined as the mean difference between measured and reported values for all children in the group.

[‡] Sample weights accounted for the unequal probabilities of selection, oversampling, and non-response.

^{a, b, c} Groups were compared across rows with groups sharing a common superscript not significantly different from each other using Tukey's Studentized Range Test at a 5% procedure-wise error rate.

In addition, the coefficients were smaller for height compared to weight indicating that height was a greater source of random error than weight. Correlation coefficients for BMI were consistently smaller compared to weight and height coefficients for the corresponding age categories. This would be expected given that height was squared in the denominator of the BMI calculation and the coefficients indicated that height was a larger source of random error than weight. These values indicate considerable deviation between reported and measured values for many children. Using the criterion, $r = 0.90$, for acceptable reliability, parents for this child population generally did not report with acceptable reliability.

Discussion

Although reported heights and weight for children are frequently collected in clinical and public health

environments, their validity and reliability have rarely been studied. The present work examined the quality of parent reported heights and weights for boys and girls 2-11 year for three ethnic groups. National surveys such as the Continuing Survey of Food Intakes for Individuals (CSFII) (10), the 1998 CSFII Child Supplement (10), the National Health Interview Survey (11), the Child Development Supplement to the Panel Study of Income Dynamics (PSID) (12), Medical Expenditure Panel Survey (MEPS) (13), and many state surveys rely on reported heights and weights for children. Because reported heights and weights are easily obtained compared to measured values requiring a trained technician, they will continue to be used (14). Consequently, knowledge of the magnitude, direction and variance of this reporting bias (ie, systematic error) is useful in planning and interpreting survey results. It is essential for users of these kinds of surveys to be well-informed about the limitations of using this kind of data. Statistical

handling cannot compensate for erroneously reported values.

Prevalence of accurately reported values

About 55% of parents and caregivers in this sample were not able to estimate either their child's height or weight, marking "Don't know" to the question while 24% did not provide estimates for both height and weight. It is reasonable to expect that those responding "Don't know" would report with even less accuracy than those who reported heights and weights. Using the entire sample in the denominator therefore represents 'the most probable' case that can be made for reported values. Including "Don't know" responses as inaccurate estimates of height, 86% of parents did not report their children's height with accuracy. For weight, 85% did not report accurately. For BMI derived from these reports, 94% were classified as inaccurate.

Using the entire sample, only 6% of parents or caregivers reported values within a $\pm 2\%$ level of accuracy. A large percentage of parents said they did not know their children's heights (53%) and weights (25%). Using the sub-sample of children with reported and measured values, the magnitude and direction of error varied by age, ethnicity, and sex.

Bias in reported values

Our analyses demonstrated that the child's age and ethnic/racial group are important factors when considering the use of parent-reported height and weight for children. Mexican-American and non-Hispanic black children 2-11 years had greater height and BMI errors than non-Hispanic white children. Generally, we observed substantial under-reporting of height for the three age categories with less under-reporting for non-Hispanic white and black boys, 9-11 years. The result of underreported height is larger calculated BMI values. Bias for height and BMI is greater for younger children (see table 2). For example, the mean overestimate of BMI is 14.5% for 2-5 y olds compared with a bias of 3.1% for 9-11 year olds.

Given that heights and weights in the final sample differed from those lost to exclusion criteria, care must be taken with interpretation of results. Those lost to the analysis for bias were younger, and thus in the age category where errors tended to be larger relative to body size.

Comparison to adult studies. The consistent under-reporting of height seen for children is different from the findings for adults who tend to over-report height (1,8,9,14). As height is squared in the denominator of the child's BMI calculation, the bias for BMI is dramatic.

Random errors in reported values

Reported weight reflects well the relative ranking of measured weight, as indicated by the large reliability coefficients. The use of reported weights as continuous variables in multivariate analyses probably would result in only small errors in the values of the coefficient for weight. However, the smaller coefficients for reported height and BMI suggest that these reported data could be problematic as continuous variables in multivariate analyses.

Comparison with similar study. Our results compare favorably with those of Davis who studied Mexican American mothers' reports for their children with the exception of height for 2-5 year olds (3). Our coefficient of 0.66 for height contrasted with Davis' 0.41 value. It should be noted, however, that the cut points for age categories differ between the two studies.

Comparison with adult studies

Compared to studies for adults, our findings with children reveal smaller reliability coefficients. Charney et al (15) reported a correlation of 0.96 between measured and reported weight for 50 adults (20-30 years of age). Jeffrey (16) found weight correlations of 0.99 for both male and female employees at 32 worksites in Minneapolis-St. Paul and Kuczarski (17) found reliability coefficients of 0.89 to 0.97 for BMI for his nationally representative sample of US adults. We found considerably smaller

coefficients for children ranging from .30 to .61 for BMI and .83 to .90 for weight.

The finding that parents of Mexican-American children were less likely to accurately report heights and weights of their young children is of particular interest. The standard unit of measurement for heights and weights is metric in Mexico. Although respondents were given a choice of metric or English units, Mexican-American immigrants may have felt the need to report using English units. Their reports in inches were consistently underestimated. We would expect a larger variability in reported values among lower socioeconomic families where measurement devices may be less likely to be present and the children may make fewer visits to medical offices. In fact, we did observe this to be true in an analysis of household income and BMI errors (not shown).

Limitations

Although the measurement and interview processes used for NHANES were subject to rigorous standardization and quality control procedures, some factors may have influenced our findings and consequently their interpretation. The time lapse between the interview in the home with its reported responses and the examination with its measured weights and heights at the MEC was 2-6 weeks. Some children in the sample may have had a slight growth in stature and body weight during this period. Thus, part of the underreporting could, in fact, be due to actual changes in the two variables. Unlike height, daily fluctuations in the child's weight could account for some of the difference between reported and measured weight. Knowing their children would eventually be measured for weight and height at the MEC, could have influenced parental reporting.

Conclusions

We conclude that reported weight and heights for children are subject to substantial bias and random error. Our results suggest that users of datasets from school, state, and national surveys and clinicians relying on reported values should consider four main issues. First, the majority of parents in this

representative sample marked "Don't know" when asked for estimates. Second, of those willing to estimate values, total errors were substantial particularly for height and, consequently, for calculated BMI. Third, calculated BMI was consistently overestimated. Fourth, errors for BMI were particularly high for non-Hispanic black children and young Mexican-American children.

For analyses of public health survey data where height, weight, or calculated BMI is the outcome variable, a case cannot be made for using reported values with the possible exception of weight. For monitoring population trends in BMI and evaluating the effects of relative body weight on health status, the differences between measured and reported heights and calculated BMI are significant. These errors would alter results. Our findings suggest that children's BMI derived from reported weight and height differ significantly from the corresponding measured value and that the deviation differs by age, sex and ethnic/racial groups further confounding conclusions of public health studies. Use of children's BMI values calculated from reported values is misleading at best and completely erroneous at worst.

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The burden of chronic fatigue syndrome (CFS) in Canada

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Abstract

Chronic fatigue syndrome (CFS) poses many socioeconomic, psychosocial, disability and quality of life difficulties for people with CFS in Canada. The self-reported prevalence of CFS was 0.78%, 1.22% and about 201,900, 331,500 Canadians have reported having CFS in 2000 and 2005 respectively. Canadians aged 40-64 years old (57.87% in 2000, and 58.59% in 2005) were the most frequently infected. More female Canadians (71.41% in 2000, and 68.44% in 2005) were affected than males (28.59% and 31.56%). Both physical and mental fatigue caused by CFS cost the Canadian economy an estimated \$3.5 billion per year, and the annual lost productivity in Canada is estimated at \$2.5 billion in 2003. However, the capacity in Canada for prevention and management of CFS is limited. Currently, there are only few medical doctors using the Clinical Working Case Definition, diagnostic and treatment protocols. Therefore, we need more research in the surveillance, diagnosis, treatment, and evaluation of CFS management in Canada.

Keywords: Chronic fatigue syndrome, lifestyle, socioeconomic status, burden, disability, CCHS, Canada.

Introduction

Chronic fatigue syndrome (CFS) is an illness, which is characterized by long term debilitating fatigue that lasts for more than six months. Patients experience a substantial reduction in their ability to participate in occupational, socially or physically demanding activities. Patients with CFS do not recover from their fatigue with rest (1). CFS is prevalent in the Canadian community and it is costly to the health care system. Without treatment, the symptom of CFS worsens with time. Its causes are not fully understood; however, multiple risk factors have been suggested to influence the occurrence, some of the factors include over 40 years of age, being female, having a sedentary or unhealthy lifestyle. The capacity in Canada to

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accurately monitor and forecast trends or evaluate the effects of interventions is evidently limited (2). At present Canada does not have a CFS surveillance system. For this reason, this nation is not able to accurately measure the potential associations of this syndrome's prevalence, incidence, hospitalization, disability, mortality and economic burden.

Many individuals who suffer from CFS experience financial hardship and psychosocial problems, which reduces their quality of life. The self-reported prevalence of CFS in Canada increased from 0.78% in 2000 (201,940), to 1.22% in 2005 (331,530 cases) (3). Canadians aged 40 years and over were the most frequently affected with CFS compared to other age groups. More females reported having CFS than males. A recent study from the United Kingdom estimated the cost of CFS at 3.46 billion pounds per year. To crudely convert to Canadian dollars and adjust for size of this nation's economy (just under half of the British one) and currency exchange (just over double), the physical and mental fatigue caused by CFS cost the Canadian economy would be about \$3.5 billion per year, and the annual lost productivity in Canada due to CFS is estimated at \$2.5 billion in 2003 (4). The second study was done through the Center for Disease Control and Prevention in the US. It focuses on calculation of the loss of productivity of just over \$20,000 US dollars per CFS patient each year, and there is in total a productivity loss of \$9.1 billion US, which has been converted to the Canadian context (adjusting for GDP and exchange rates). This would be about \$1 billion in Canadian economic loss (5). However, the capacity in Canada to prevent and manage CFS is limited. Currently, there are few medical doctors working on the clinical case definition, diagnostic and treatment protocols, and research. Furthermore, there is no gold standard laboratory or a specific diagnostic test available in Canada. Presently, there is no consensus among Canadian doctors as to the clinical definition of CFS. Medical training program related to the syndrome do not exist. Furthermore, there is no financial support for research projects relating to CFS (6). Therefore, we need more research in the surveillance, diagnosis, treatment, and evaluation of CFS management in Canada.

Risk factors and diagnosis

The causes of CFS remain unknown. Clinicians have proposed one or more risk factors, which might trigger the occurrence of CFS. These may include viral infection, injury, psychological depression, profound stress or exposure to toxins (7). While a single cause for CFS may yet be identified, another possibility is that CFS represents a common endpoint of disease resulting from multiple precipitating causes (8). In Canada and worldwide, researchers continue to explore possible causes, risk factors and triggering factors for the condition. However, many questions still remain about diagnosis since there is no treatment guideline or CFS case definition. The idea that CFS is an illness that primarily affects white, middle-class, well-educated, professional women still needs to be verified (2).

Methods

The Canadian Community Health Survey (CCHS) (9) is a collaborative effort between Statistics Canada, Health Canada, Public Health Agency of Canada and the Canadian Institute for Health Information. This national household cross-sectional survey was created to gather national health-related data to provide timely estimates of Canadians demographic information, lifestyle, risk factors, and socioeconomic status. The CCHS began collecting its first cycle of data in September of 2000, and subsequent data collection is based on a two-year collection cycle. Data from CCHS Cycle 1.1 (2000) to 3.1 (2005) were used in this analysis. The survey excluded individuals living on crown or reserve land, in institutions, members of the Canadian Armed Forces, and in certain remote areas of the country; but it still represents ~98% of the Canadian population over 12 years of age (10). A multistage stratified cluster design combined with random sampling methods was used to select the sample (10).

Sampling

The CCHS is scheduled to collect data every month from that point forward. Each two-year collection

cycle comprises two distinct surveys: a health region-level survey in the first year with a total sample of 130,000, and a provincial-level survey in the second year with a total sample of 30,000. Sample sizes in any particular month or year can increase from provincial or health region-level buy-ins. Both computer-assisted personal and telephone interviews are planned (9). There was one randomly selected respondent per household. Eligibility for the first collection cycle were limited to only those 12 years of age and over; although it is expected that in future cycles, child-specific content will be included.

Definition of covariates

The self-reported covariates in the analysis are age, gender, living area (province/territories, urban/rural) lifestyle (smoking status, frequency of alcohol use, and physical activity) and socioeconomic status (education, income, immigration status). The level of education achieved by all members of the household was grouped into three categories (less than secondary, secondary, postsecondary school or more). Family income was classified on the basis of total household annual income and the number of household members into low (<\$30,000 CAD) or middle (\geq \$30,000 to \$59,999 CAD) and high (\$60,000 CAD and over) level. Immigration status includes participants that were either born in Canada or were born elsewhere. Other variables were included in the analysis: physical activities were categorized as active, moderate, and inactive, based on kilo-calories per kilogram of body weight per day expended (KKD). Physically active is defined as an energy expenditure of at least 3 KKD; moderately active corresponds to energy expenditure between 1.5 and 3 KKD; physically in-active is defined as less than 1.5 KKD. The highest level of physical activity can be achieved by playing team sports for an hour or a half an hour of running, combined with an accumulated hour of walking throughout the day (11,12). Cigarette smoking was evaluated by three different methods: 1) patients were asked if they had ever smoked a whole cigarette (yes, no)? 2) if they were a 'current smoker' (daily, occasionally, not at all); 3) or a 'former smoker' (stopped smoke meanwhile survey was started). Patients were asked

on a questionnaire how often they drank alcohol. They were asked to categorize their drinking habits as being "a regular drinker", "a former regular drinker(one who used to drink regularly, but no longer does)", or "a non-drinker" (a person who does not drink alcohol). The occurrence of CFS related to risk factors or socioeconomic status were calculated for total population and compared in proportions in people with or without CFS, where statistical significance was conducted by Odds Ratio and P values.

Data analysis

A descriptive model has been used to examine demographics, lifestyle, and socio-economic factors that could influence the occurrence of CFS. Multivariate logistic regression was then employed to determine independent factors associated with CFS, with Odds Ratio (OR) and P values calculated for each model. The logistic regression models were bootstrapped to take the design effects of the CCHS into account. Data was analysed using the SAS version 9.1 (SAS Institute, Cary, NC) (13).

Results

The adjusted prevalence of CFS increased from 0.78% to 1.22% from 2000 to 2005 in Canada. Individuals aged 40-64 years were more likely to report having CFS compared to other age groups in both 2000 (OR, 1.51; $P<0.005$) and in 2005 (OR, 2.67; $P<0.001$). Females made up more than two-thirds of reported cases in both 2000 and 2005 (see table 1). There are no significant statistical differences between current smoking and former smoking (OR from 0.51 to 0.86, $P>0.05$). However, the differences for CFS patients with less than secondary school education level (OR, 1.24 in 2000 and OR, 1.25 in 2005, $P<0.01$), and secondary school level (OR, 1.14 in 2000 and OR, 1.08 in 2005, $P<0.05$) are significant in comparison to post-secondary school educated individuals. Regular alcohol users (OR, 1.11, $P<0.05$ in 2000 and OR, 1.27, $P<0.01$ in 2005) have higher occurrences than non-alcohol users, but former regular alcohol users (OR from 0.66 to 0.96, $P>0.05$

in 2000 and in 2005) had no significant differences compared to non-drinking individuals. Moreover, non-immigrant Canadians (OR from 0.83 to 0.89, $P>0.05$) who live in the urban area (OR from 1.21 to 1.28, $P<0.01$), who have low family income level (OR, 1.37, $P<0.01$ in 2000 and OR, 1.18, $P<0.05$ in 2005), middle family income (OR, 2.48, $P<0.001$ in 2000, OR, 1.06, $P>0.05$ in 2005), those who were physical inactive (OR from 1.33, $P<0.01$ to 1.55,

$P<0.005$) were exposed to more risk of CFS than others.

The prevalence of CFS is higher in Nunavut (1.09%), Nova Scotia (0.90%), Quebec (0.90%), Alberta (0.80%), and Ontario (0.79%) in 2000; however, this prevalence in Nova Scotia (1.47%), Quebec (1.38%), and Ontario (1.29%) in 2005 is higher than Canadian nation level (1.22%) (see table 1).

Table 1. Adjusted self-reported prevalence of Chronic Fatigue Syndrome (CFS) by age, sex, lifestyle, socioeconomic status and geographic in the CCHS, Canada, 2000-2005

Chronic Fatigue Syndrome	2000		2005	
	Cases of CFS	Prevalence (%)	Cases of CFS	Prevalence (%)
Cases of CFS	201,938	0.78	331,526	1.22
Non-CFS	25,597,000	99.17	27,057,000	98.48
Missing cases	12,131	0.05	82,510	0.30
Total	25,811,069	100.00	27,471,036	100.00
Provinces & Territories				
Newfoundland & Labrador	1,636	0.36	3,197	0.71
PEI	469	0.40	445	0.38
Nova Scotia	7,067	0.90	11,711	1.47
New Brunswick	4,815	0.76	5,838	0.91
Quebec	55,898	0.90	89,317	1.38
Ontario	78,206	0.79	136,457	1.29
Manitoba	3,780	0.42	7,521	0.81
Saskatchewan	4,330	0.54	6,554	0.83
Alberta	19,896	0.80	31,194	1.16
British Columbia	25,502	0.75	38,900	1.08
YUKON	39	0.16	173	0.64
NWT	86	0.27	205	0.59
NUNAVUT	212	1.09	10	0.07
Total	201,938	0.78	331,526	1.22
Age (year)				
12-19	8,303	4.11	6,586	1.99
20-39	51,226	25.37	63,731	19.22
40-64	116,864	57.87	194,235	58.59
65 & over	25,544	12.65	66,974	20.20
Total	201,937	100.00	331,526	100.00
Sex				
Males	57,736	28.59	104,639	31.56
Females	144,402	71.41	226,886	68.44
Total	201,938	100.00	331,526	100.00
Smoking status				
Non-smoker	55,180	27.40	86,142	26.00
Chronic Fatigue Syndrome		2000	2005	

	Cases of CFS	Prevalence (%)	Cases of CFS	Prevalence (%)
Current smoker	65,792	32.68	112,439	33.93
Former smoker	80,381	39.92	132,760	40.07
Total	201,353	100.00	331,341	100.00
Education levels				
Less than secondary school	30,941	15.77	34,624	11.70
Secondary school	27,969	14.26	29,808	10.07
Post-secondary school	137,248	69.97	231,577	78.23
Total	196,159	100.00	296,009	100.00
Alcohol drinker				
Regularly drinker	137,659	68.34	228,633	70.00
Former drinker	43,954	21.82	79,040	24.20
Non-drinker	19,823	9.84	18,957	5.80
Total	201,436	100.00	326,630	100.00
Living area				
Urban	170,171	84.27	278,304	83.95
Rural	31,767	15.73	53,221	16.05
Total	201,938	100.00	331,526	100.00
Immigrant status				
Immigrant	38,874	19.36	72,108	22.40
Non immigrant	161,959	80.64	249,789	77.60
Total	200,833	100.00	321,897	100.00
Total yearly family income				
Less than \$29,999	48,595	25.99	99,505	36.47
\$30,000 - \$59,999	108,969	58.28	88,992	32.62
\$60,000 & over	29,421	15.73	84,322	30.91
Total	186,985	100.00	272,818	100.00
Physical activity				
Active	29,641	16.14	54,614	17.16
Moderate	31,178	16.98	70,092	22.02
Inactive	122,818	66.88	193,619	60.82
Total	183,637	100.00	318,325	100.00

Discussion

Chronic fatigue syndrome (CFS) is one of a group of illnesses which have unexplained and unknown causes; others include fibromyalgia, diffuse pain and irritable bowel syndrome (14). However, these do not necessarily have the same causes and symptoms. For example, patients may sleep poorly and thus develop fatigue, whereas people who have disturbed sleep and inactivity may have different conditions (15). The

exact risk factors and causes of CFS have not been identified yet. Researches have theorized that this syndrome may be related to infectious and immunologic, psychiatric, behavioural, socioeconomic and environmental factors (16).

Studies have found that there is a high economic and disability burden associated with CFS, for the families and society as a whole. A conservative estimate of the direct economic impact of CFS and the huge health care expenditure in Canada is about \$3.5

billion per year. The cost to governments in Canada is about \$2.2 billion per year in 2002 (4). At a personal level, economic losses caused by absenteeism can have a substantial long-term impact on CFS patients' quality of life. With high unemployment rates among individuals with CFS, there is a surcharged cost of medical services that could become even more problematic to CFS patients and their families, due to

a loss of health insurance benefits, and thus, increases in out-of-pocket medical expenses (17). Bombardier and Buchwald (18) estimated an average annual medical expenditure of \$1,031 CAD per CFS patient. Lloyd and Pender (19) and McCrone et al (20) also used samples from Australia and the United Kingdom respectively, to estimate the same situation.

Table 2. Adjusted Odds Ratio and 95% confidence interval between age, gender, lifestyle, and socioeconomic status for CFS in the CCHS, Canada, 2000-2005

Chronic Fatigue Syndrome	2000		2005	
	Percent(%)	Odds Ratio (OR) and P-Value	Percent(%)	Odds Ratio (OR) and P-Value
^a Age (year)				
<40 and 65+	42.13	1.00	41.41	1.00
40 – 64	57.87	1.51; P<0.005	58.59	2.67; P<0.001
^b Gender				
Males	28.59	1.00	31.56	1.00
Females	71.41	2.49; P<0.001	68.44	2.46; P<0.001
^c Risk factors and socioeconomic status				
Smoking status				
Non-smoker	27.40	1.00	26.00	1.00
Current smoker	32.68	0.51; P>0.05	33.93	0.58; P>0.05
Former smoker	39.92	0.71; P>0.05	40.07	0.86; P>0.05
Education levels				
Post-secondary school	69.97	1.00	78.23	1.00
Less than secondary school	15.77	1.24; P<0.01	11.70	1.25; P<0.01
Secondary school	14.26	1.14; P<0.05	10.07	1.08; P>0.05
Alcohol drinker				
Non-drinker	9.84	1.00	5.80	1.00
Regularly drinker	68.34	1.11; P<0.05	70.00	1.27; P<0.01
Former drinker	21.82	0.66; P>0.05	24.20	0.96; P>0.05
Living area				
Rural	15.73	1.00	16.05	1.00
Urban	84.27	1.28; P<0.01	83.95	1.21; P<0.01
Immigrant status				
Immigrant	19.36	1.00	22.40	1.00
Non immigrant	80.64	0.89; P>0.05	77.60	0.83; P>0.05
Income				
\$60,000 & over	15.73	1.00	30.91	1.00
Less than \$29,999	25.99	1.37; P<0.01	36.47	1.18; P<0.05
\$30,000 - \$59,999	58.28	2.48; P<0.001	32.62	1.06; P>0.05
Physical activity				
Active	16.14	1.00	17.16	1.00
Moderate	16.98	0.88; P>0.05	22.02	1.01; P>0.05
Inactive	66.88	1.33; P<0.01	60.82	1.55; P<0.005

a. Adjusted Odds Ratio were controlled by gender, risk factors and socioeconomic status.

b. Adjusted Odds Ratio were controlled by age, risk factors and socioeconomic status.

c. Adjusted Odds Ratio were controlled by age and gender.

The study results in table 1-2 revealed that CFS afflicts people in the age group (40-64 years) at twice the rate of other age groups. The occurrence of CFS in females is also more common than in males. Regular alcohol use, people have a low education level (less than secondary schooling), being a non-immigrant status, being a Canadian living in an urban area, physical inactivity, and having lower annual family income (less than \$29,999 CAD) have a higher prevalence and burden.

Conclusions

CFS is a chronic, severely disabling medical disorder. It is problematic to the patients socioeconomic and psychosocial status. It can be more accurately diagnosed and treated symptomatically with improved surveillance, research, and management. Further developing funded knowledge exchange, health education, and research may reduce the burden and result in better outcomes for CFS patient treatment and management.

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Adolescent tobacco use in Himachal Pradesh, India

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Abstract

To estimate the prevalence and associated factors of tobacco use among school-going adolescents in Himachal Pradesh, India. Data from the Global Youth Tobacco Survey (GYTS) 2004 was used to determine tobacco use prevalence, determinants, attitudes, and exposure to tobacco advertisements among adolescents. Frequencies and their 95% confidence intervals (CI) were calculated. Odds ratios (unadjusted (OR) and adjusted (AOR)) and their 95% CI were obtained using logistic regression analysis. Of the 1,976 respondents for whom gender was recorded, 6.4% males and 3.9% females reported current tobacco use ($p = 0.021$). After controlling for age, gender, parental tobacco use status, and perception of risks of tobacco use, 'having some friends who were tobacco users' was associated with tobacco use (AOR = 4.65; 95% CI [2.85, 7.58], the association being stronger if all their friends were tobacco users AOR=11.78; 95% CI [4.84, 28.63]. Participants reported high exposure to tobacco advertisements on billboards (71.0%), and television (53.3%). Nearly one in seven respondents (14.7%) reported possessing an item with a tobacco brand on it. The proportion of males who felt that tobacco use was harmful was higher than that for females ($p=0.002$). Findings from this study emphasize the critical role of friends, and the media in influencing adolescent tobacco use behaviours and the need for considering social and domestic environments in planning gender-specific interventions for this vulnerable population subgroup.

Keywords: Tobacco, cigarettes, smoking, adolescents, India

Introduction

Tobacco use is a leading cause of non-communicable diseases such as chronic obstructive pulmonary disease, cardiovascular conditions and a range of cancers (1). There is growing evidence that while tobacco use has stabilised or is in decline in industrialised nations, there is increased prevalence of use in resource-limited settings and emerging economies (2). A list of reasons why this situation

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has arisen include: aggressive marketing by tobacco firms, limited public health interventions; and a pre-occupation with communicable diseases that has overstretched public health efforts (3-6). Furthermore, the global proliferation of various mass media, may also have contributed to the “globalisation” of tobacco use (7,8).

While data on tobacco use, especially data on cigarette smoking and associated factors among adolescents in many states in India has been reported, data from some areas are limited. Data is also currently available on the factors that are associated with tobacco use among adolescents in other international settings (9-12). Public health program planners are likely to benefit from data generated from their own geographical areas when considering options to determine the most efficient allocation of often scarce public intervention resources for example, by targeting factors that are strongly associated with tobacco use based on the effect measures. Furthermore, in the absence of published data, it may be difficult to raise the social profile and concerns associated with tobacco use among researchers and policy makers. Finally, meta-analysis of data on the factors that are associated with tobacco use can only be carried out using available published information.

A recent publication by Sinha et al (13) aimed at linking tobacco control policies and data on tobacco use in India considered the prevalence of the following attributes among 13 to 15 year olds in India: smoking, cessation experience, exposure to second-hand smoke, access to, and availability of tobacco; and exposure to advertisements. Not only is this study population restricted to ages 13 to 15 years, as is the focus of the GYTS (Global Youth Tobacco Survey), but only prevalence estimates and not an assessment of the associations between tobacco use and those explanatory variables were reported. It is not clear whether those exposures are in fact associated with tobacco use. Furthermore, Sinha et al (13) aggregated data from all states in the country and average India estimates were obtained and no individual state estimates were reported.

The India Tobacco Control Act (ITCA) was signed into law in 2003 with the goal to reduce tobacco consumption and protect citizens from exposure to secondhand smoke (SHS). In 2005, the

Indian government ratified the World Health Organization Framework Convention on Tobacco Control (WHO FCTC). Among the many provisions of the ITCA are sections prohibiting smoking in public places, prohibiting direct or indirect advertisement of cigarettes and other tobacco products on billboards and in all media excluding point of sale, and prohibiting the sale of tobacco products to persons less than 18 years of age that is the focus of the GYTS. Data used in this article were collected in 2004, possibly before the ITCA had enough time to effect meaningful changes regarding tobacco use practices among adolescents in India.

In this paper we attempt to estimate the prevalence and associated factors of tobacco use among in-school adolescents in Himachal Pradesh, India. Previous studies from this setting have not reported on factors that may be associated with tobacco smoking and therefore important in the prevention of smoking.

Methods

The present study was a secondary analysis of publicly available data from the Centers for Disease Control and Prevention (CDC) on the 2004 Global Health Survey for the State of Himachal Pradesh, India. The survey was conducted according to the Global Tobacco Surveillance System (GTSS) as has been described elsewhere (14). The GYTS used a standard survey questionnaire with core questions (the same in all geographical settings) and country-specific questions that countries can add to cover research questions considered pertinent by country cooperating partners as critical for that particular setting.

The GYTS recruits in-school adolescents in classes with the majority of its students being between the ages 13 and 15 years. A two-stage cluster sampling survey approach is used in which the primary sampling units (PSUs) are schools with students in the eligible age group (13-15 years). At the second stage of sampling, eligible classes (classes with the majority of students of ages 13 to 15 years) within the selected schools are randomly selected. All the students within the selected classes are eligible to participate in the study, regardless of their actual ages.

Only students who are present on the day the survey is administered in a particular school are surveyed and no replacement of absent students is attempted. While all students eligible and present are invited to participate, the students are informed that they are free to elect not to participate and also free not to answer any question with which they feel uncomfortable. Surveys using the same methodology have been conducted in other settings (13).

The GYTS questionnaire is administered and anonymously self-completed within a single class period. Information collected include the following variables: age, sex, current smoking status, parental smoking, having friends who smoked, perception that smoking is harmful to health, exposure to tobacco advertisements, and approval of smoking among boys and girls.

Data analysis

Data were obtained from the CDC and analyzed using SUDAAN software 9.0 (Research Triangle Institute, Research Triangle Park, North Carolina, United States). Frequencies and 95% confidence intervals (CI) of relevant variables such as demographics, approval of smoking among boys and girls, and exposure to tobacco advertisements were generated and are reported. To assess the associations between a selected list of variables identified from the literature as possibly associated with current cigarette smoking, logistic regression analysis was conducted both at bivariate and multivariate level. These explanatory variables were: sex; age; smoking by the best friend, and parental smoking.

The bivariate logistic regression analysis was conducted to obtain unadjusted odds ratios (OR) with current tobacco use (Yes or No) as the outcome of interest. Tobacco use was defined as having used tobacco in any form (smoking, chewing or applying tobacco) during the past 30 days.

Each of the following variables was considered as explanatory variables: age; sex; peer smoking; parental smoking; and perception that smoking is harmful. Further multivariable models were also fitted to obtain adjusted odds ratios (AOR).

Results

Of the 1,976 students for whom gender was reported, 41.8% were females. The median age for the sample was 15 ($Q_1=16-17$, $Q_3=14$) years. The prevalence of current tobacco use was 6.4% (95% CI [5.1, 8.0]) among males and 3.9% (95% CI [2.8, 5.5]) among females.

Table 1 indicates that in bivariate analysis, males were more likely to use tobacco than females (OR=1.66; 95% CI [1.08, 2.56]). Compared to participants whose parents did not use tobacco, those with parents who were tobacco users were more likely to use tobacco (OR=1.85; 95% CI [1.23, 2.79]). Those with most or all friends who used tobacco were 14 times more likely to use tobacco than those who had no friends who used tobacco (OR=14.36; 95% CI [6.77, 30.46]). Participants who perceived that tobacco use was harmful were less likely to use tobacco than those who did not perceive tobacco as harmful to health (OR=0.56; 95% CI [0.37, 1.00]).

Table 1 also indicates that in multivariate analysis, having close friends who used tobacco was very strongly associated with tobacco use after controlling for age, gender, parental tobacco use, and perception of hazards caused by tobacco use. Those who had most or all friends who used tobacco were more than 11 times likely to use tobacco than those who had no friends who used tobacco (OR=11.71; 95% CI [4.79, 28.64]). Those who had some friends who used tobacco were more than four times likely to use tobacco than those who had no friends who used tobacco (OR=4.65; 95% CI [2.85, 7.58]).

Table 2 indicates that participants were exposed to tobacco advertisements through billboards (71.0%), and television (53.3%). More than one in ten respondents (14.7%) reported possessing an item with a tobacco brand logo on it. There was no gender difference in rates of those who reported having an item with a tobacco brand logo ($p=0.851$) nor on prevalence of exposure to tobacco advertisements on hoardings ($p=0.149$) and television ($p=0.474$).

Table 3 indicates that the majority (84.8%) of respondents felt that tobacco use was harmful to health. The proportion of males (87.1%) who felt that tobacco use was harmful was significantly higher ($p=0.002$) than that for females (81.6%). All participants thought that male smokers had more

friends compared to 12.5% who felt that females who used tobacco had more friends. About 1 in 4 respondents thought that males and females who used tobacco were attractive (26.7% and 24.7% respectively).

Table 1. Factors associated with current tobacco use in Himachal Pradesh, India

Characteristic	Percentage of smokers	Unadjusted Odds ratio (95% Confidence Interval)	Adjusted Odds ratio (95% Confidence Interval)
Age (years)			
11–12	3.8	1.00	1.00
13	6.4	1.71 [0.71, 4.08]	1.29 [0.49, 3.34]
14	3.9	1.03 [0.44, 2.45]	0.87 [0.34, 2.21]
15	4.8	1.27 [0.55, 2.94]	0.98 [0.39, 2.47]
16–17	7.1	1.93 [0.86, 4.31]	1.15 [0.46, 2.84]
Gender			
Female	3.9	1.00	1.00
Male	6.4	1.66 [1.08, 2.56]	1.21 [0.73, 1.99]
Parental tobacco use			
None	4.1	1.00	1.00
One or both parents smokers	7.3	1.85 [1.23, 2.79]	1.30 [0.81, 2.07]
Best friends tobacco users			
None	3.1	1.00	1.00
Some	12.7	4.63 [2.99, 7.16]	4.65 [2.85, 7.58]
Most or all	31.2	14.36 [6.77, 30.46]	11.71 [4.79, 28.64]
Perception that tobacco use is harmful			
No	7.2	1.00	1.00
Yes	4.7	0.56 [0.37, 1.00]	0.87 [0.46, 1.63]
Family member discussed harmful effects of tobacco use			
No	5.9	1.00	1.00
Yes	4.9	0.84 [0.56, 1.28]	0.84 [0.51, 1.39]

Table 2. Exposure to tobacco advertisements distributed by gender among adolescents in Himachal Pradesh, India

Characteristics	Number of participants	% of total and 95% CI [p value]*
		[P=0.474]
Seen tobacco brand name on TV in past 30 days	1973	53.3 [51.0, 55.5]
Males	1140	54.0 [51.1, 56.9]
Females	833	52.2 [48.7, 55.6]
		[P=0.851]
Has item with tobacco brand logo	1969	14.7 [13.2, 16.4]
Males	1136	14.8 [12.8, 17.1]
Females	833	14.6 [12.3, 17.1]
		[P=0.149]
Seen tobacco adverts on hoardings in past 30 days	1973	71.0 [68.9, 73.0]
Males	1140	72.3 [69.6, 74.9]
Females	833	69.1 [65.8, 72.2]

* p value comparing levels of exposure between males and females

Table 3. Attitudes towards tobacco use distributed by gender among adolescents in Himachal Pradesh, India

Characteristic	Number of participants	% of total and 95% CI [p value]*
Felt that boys who use tobacco have more friends	1701	100
Males	1000	100
Females	701	100
		[P<0.001]
Felt like girls who use tobacco have more friends	1647	12.5 [10.9, 14.3]
Males	959	15.5 [13.3, 18.0]
Females	688	8.3 [6.4, 10.6]
		[P=0.673]
Felt that boys who use tobacco are attractive	1337	26.7 [24.3, 29.1]
Males	789	27.9 [24.8, 21.2]
Females	548	24.9 [21.5, 28.7]
		[P=0.002]
Felt that girls who use tobacco are attractive	1675	24.7 [22.7, 26.9]
Males	978	27.7 [24.9, 30.6]
Females	697	20.5 [16.7, 23.7]
		[P=0.002]
Felt that tobacco use is harmful to health	1772	84.8 [83.0, 86.4]
Males	1028	87.1 [84.8, 89.0]
Females	744	81.6 [78.6, 84.3]

* p value comparing levels of exposure between males and females

Discussion

We report an overall current tobacco use of 6.4% (95% CI [5.1, 8.0]) among males and 3.9% (95% CI [2.8, 5.5]) among females ($p = 0.021$). We did not find male predominance of tobacco use after adjusting for possible confounders. The male predominance has been reported with regard to cigarette smoking in other settings (16-18). However, this finding is not universal. For instance, in the United States of America, cigarette smoking rates are similar among male and female adolescents (19), while in other countries like Turkey, the gender gap is closing (20). We suggest that the acceptability of smoking among males compared to females may be responsible for the higher rates found in males in Himachal Pradesh. We found in the current study that tobacco use among boys was perceived as more favourable compared to use in females.

As also reported in other studies, we found that the likelihood of being a tobacco user were higher among adolescents whose friends used tobacco, and

among those who had parents who used tobacco, and among males (in univariate analysis only). Although there was higher reported tobacco use among adolescents 16-17 years old (7.1%) compared to those 11-12 years (3.8%), the difference was not statistically significant. When designing specific anti-tobacco intervention programs, these study findings suggest the importance of focusing efforts directed at friends who use tobacco.

In a cross sectional study, and when data on the temporal sequence of events are not available, it is not possible to determine if a factor is causally associated with the outcome (tobacco use) (21,22). In the context of this study analysis, it is not possible to assess whether befriending a smoker is a cause of tobacco use or if tobacco users themselves are more likely to befriend other tobacco users. Perhaps, both mechanisms may be at work. Another explanation for this observation may be that tobacco users are more likely to influence others to initiate and continue this behaviour.

We did not find that adolescents who believed that tobacco is harmful to health were less or more

likely to use tobacco. While we posit that adolescent education about the effects of education is a worthwhile exercise, it may not necessarily result in significant behavioural change. This is not surprising as knowledge alone has been found to be insufficient to effect positive behavioural change (24).

We report in the present study levels of exposure to tobacco advertisement in various forms of media. We consider the study results as baseline findings to assess the potential future impact of the India Tobacco Control Act (which was signed into law the same year of the survey) and the WHO FCTC efforts to prevent tobacco advertisement in India.

Despite the inherent strengths of this study (such as, obtaining a cross state sample and using a standardized questionnaire), the present study has several limitations. First, as data were collected by a cross sectional survey, the effect measures reported (odds ratios) are only indicative of associations between the variables. Hence, one cannot ascribe causation. Second, self-reported data is based on the subject's memory and honesty. To the extent that study participants intentionally misreported or failed to recall any of the variables, our results may be biased. Third, no attempt was done to verify or validate current tobacco use with tobacco metabolites laboratory analysis of specimens such as saliva or urine (25). Finally, the data were collected from adolescents attending school and available on the day their school was visited by the data collection team. If out of school adolescents and students who were absent differed from other students in their tobacco use, our results may not be representative of all adolescents in Himachal Pradesh.

Conclusions

Using data from the 2003 Himachal Global Youth Tobacco Survey, we report a prevalence of all forms of tobacco use at 6.4% among males and 3.9% in females. Adolescent tobacco use was associated with tobacco use among friends. The proportion of males who felt that tobacco use was harmful was significantly higher than that for females. These findings call for consideration of the adolescents' social and domestic environments in the design,

implementation and evaluation of gender-specific interventions to prevent tobacco use.

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Design, implementation and assessment of an innovative anti-smoking preventive program in Greek preschool children

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Abstract

Child focused anti-smoking programs are almost non-existent in preschool education, despite the fact that a large number of young children are being brought up in environments, which are not tobacco free. The main purpose of the present study was first to record the perceptions, attitudes and familiarization of 4 to 6 year-olds about smoking and, second, to design, implement and assess the effectiveness of an innovative psycho-educational preventative program, focusing on smoking and its effects on health. Fifty-four preschool children attending state-run kindergarten schools in Central Greece participated in the study. Their perceptions, attitudes and familiarization with smoking were first assessed using an especially designed questionnaire. Approximately half of the children (experimental group) participated in a series of especially designed psycho-educational activities regarding smoking, immediately after the above assessment. All children were once again assessed with the same questionnaire after the psycho-educational activities were completed. The implementation and assessment of the program showed that it was suitably and effectively designed for preschoolers. Our results indicated that preventative programs could change young children's ideas regarding tobacco use and Environmental Tobacco Smoke and could, potentially, contribute to the formation of anti-smoking attitudes.

Keywords: Anti-smoking education, prevention program, preschool education, health education.

Introduction

Smoking is one of the most serious causes of death worldwide. According to Price et al (1) experimentation with smoking usually begins at an early age. More precisely, those who become regular smokers usually begin to smoke before the age of 18 years (2). Research suggests that adult smoking in Greece is the highest in Europe and the 3rd highest in

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the world (3,4). Adolescent smoking in Greece is also estimated to occur at a high rate (5).

Apart from tobacco use and its immediate effects on smokers, another issue that must be taken into consideration is the exposure of children to Environmental Tobacco Smoke (ETS). More precisely, ETS could cause respiratory diseases, asthma, sudden infant death syndrome (SIDS), cancer, or DNA damage (6-11). According to the World Health Organization (8) 90% of children in the Balkans are exposed to ETS. In Greece children are exposed to high levels of ETS (12). In their study with preschoolers and their parents, Vardavas et al (13) found that 63% of households had at least one current smoker.

Research supports the notion that children's attitude towards smoking is a reliable predictor of their future smoking behavior (14,15). These attitudes are correlated with a series of factors such as the socioeconomic status of the child's family (16,17), parent's attitudes towards smoking (18-21), smoking habits of the child's social environment (parents and friends) (22-25) and school environment (26,27). It appears that antismoking preventive interventions should be implemented early in the life of children, so that they adopt negative smoking attitudes from an early age.

Preventive Health Education intervention programs have been developed worldwide during the past several decades (28-31). These programs concern actions taken during the early education stages and which engage students, teachers, parents and even the wider society. In their research paper, Ariza et al (32) describe the effects of a Spanish smoking prevention program, conducted in the context of a European project on regular smoking, in a sample of Barcelona adolescents. The intervention included a school based program, reinforcement of a smoke-free school policy, smoking cessation for teachers, brochures for parents and other community-based activities involving youth clubs and tobacco sales. According to their results, after 12 and after 36 months fewer individuals in the experimental group became smokers in relation to those of the control group. In general, research review supports that school based prevention programs usually have short-term positive effects on children's smoking behavior, but there are

limited evidence regarding long-term effects of those interventions (31).

On the other hand, there is controversy regarding some anti-smoking interventions. Some feel that educating children in issues that deal with smoking and the use of other dangerous substances often results in encouraging them to experiment with the substances concerned (33). Research evidence regarding the smoking behavior of school age children in Britain showed that they begin to experiment and try the first cigarette approximately at the age of 10-11 years (34). The same phenomenon appears in Greece, according to the studies conducted by the Childs' Health Institute (35). Experts, therefore, support that education on these issues should be delayed until children reach the appropriate age level. It is interesting to note that similar positions are also held about sex education. More precisely, some feel that sex education encourages children to try casual sex. These same people feel that sexuality education should be delayed (36). However, there is always the risk that the appropriate health education messages reach the children too late, when they would have already formulated wrong perceptions and attitudes.

Taking all these into account, a preventive psycho-educational program about tobacco use and ETS in young children was designed and implemented. With the help of a fairy-tale scenario and the use of a number of creative methods and techniques the program aimed at conveying to preschool children the appropriate knowledge and perceptions that would potentially help them formulate a critical attitude towards smoking, smokers and ETS.

Purpose of the study

The objective of the study was to design, implement and assess an innovative health education preventive program on smoking and its effects in health, addressed to preschool children. The design of the program was based: a) on the developmental capabilities of preschool aged children, and b) on the Greek Kindergarten Curriculum (37). The study aimed at helping preschool children:

1. Familiarize themselves with the serious impact of smoking on human health.
2. Learn and engage in basic hygiene and protective habits.
3. Develop the right attitudes and behaviors towards smoking.

The content of the program should provide the children with:

- Knowledge about the origin and history of tobacco and smoking.
- Skills for decoding symbols relative to smoking (e.g. the non-smoking sign).
- Knowledge about the effects of active and passive smoking on human health.
- Anti-smoking perceptions and attitudes.
- Decision making skills.
- Enhanced self-esteem and assertiveness so as to be able to fight for their rights.
- Ability to convey the knowledge and experience acquired during the intervention program to members of their close social environment.

Methods

Fifty-four (N=54) randomly selected preschoolers attending Greek state kindergarten schools participated in the study (N=25 boys and N=29 girls). Children originated from both urban and rural areas of Central Greece (Magnesia prefecture) and were of middle socio-economic background. The children in the study were 4.2 to 5.9 years of age.

After primary assessment, children were divided in two groups: Twenty-eight (N=28) children formed the Experimental Group and 26 children formed a Control Group. Children in the control group matched those of the experimental in age, gender and socioeconomic status.

Instruments

For the purpose of the present research study the following methodological tools were designed:

1. *The Smoking Perceptions–Attitudes Test (SPAT)*: It was designed by two of the writers (MZ and AT). The SPAT is a developmentally appropriate instrument with open-ended and closed questions. It is addressed to pre-school children aged 4-6 years, and is administered during a structured interview. This is divided in ten subjects (see Appendix) and is accompanied by three pictures (a, b and c) and two posters (I and II) relevant to content of the questionnaire. Picture a, which accompanies subject 1, presents a number of adults, of whom some are smokers and some are not. Each child is asked to point to the researcher, which person smokes and which doesn't. Picture b, which accompanies subject 8, depicts a number of people holding their noses. Picture c, which accompanies subject 10, depicts a monkey, which smokes a cigarette, and children are asked to state what they would say to the monkey had they met. Poster I accompanies subject 7 and depicts a race track with two persons about to start racing - one of the runners is a smoker. The child is asked to answer, if those two persons raced, which one would terminate first and why. Poster II accompanies subject 9 and depicts a train and two passengers (a smoker and a non-smoker). Children are asked to say where they would seat the smoker and where the non-smoker in the train. More precisely:

- The first 3 items seek information about children's familiarity with smoking (e.g. "Point to me which person is a smoker and which is a nonsmoker in these pictures") and their experience regarding smoking environment (familial and social) (e.g. "Is there anybody at home who is a smoker?", "Have you ever been to a place where people smoked?").
- The following 4 items investigate children's perceptions about smoking (e.g. "Why do you think those people smoked?"), and about the effects of smoking on man (e.g. the child is shown a poster depicting a race track with 2 persons about to start racing – one of the runners is a smoker) and he/she is asked to answer the following question "If those two persons raced, which one would finish first and why?", or do you mean and after being shown the poster with the a train and two

persons (a smoker and a non-smoker) children were asked “Where would you seat the smoker and where the non-smoker in the train,?”).

- The last 3 items aim at exploring children’s attitudes towards smokers and smoking environment (e.g. “How do you react when you are annoyed by smoking?” or after been shown a picture of a monkey smoking the child is asked “What would you say to the monkey had you met?”).

2. *Educational activities*: A total of nine psycho-educational antismoking preventive sessions were specially designed and adapted to the program of the Greek state pre-school education system. The experts, involved in the design of the psycho-educational sessions were highly experienced preschool educators, psychologists and one biologist. The content of the sessions was designed on the basis of:

- The information extracted by SPAT pre-test results.
- The Greek Pre-school Education Curriculum, as referred in the Cross-Thematic Curriculum Framework for Nursery School (Official Gazette, issue B, nr 1366/18–10– 2001).
- The Health Action Model, which, according to Athanasiou (38) aims at reinforcing the individual’s self-esteem, as this is believed to be a very important issue in both education and health promotion. The essence of the model is based on the notion that individuals with high self-esteem are more efficient in taking responsibility of their own health (38,39).
- The Creative Learning Model, which promotes the child’s critical thinking and creativity (40). According to this model, by using creative teaching methods i.e. brainstorming, concept mapping, role playing games, etc, children’s creative learning process is activated, leading to knowledge acquisition (40).

Techniques and methods employed in the program were methods of creativity with allegorical, metaphorical and symbolic content based on active

learning e.g. brainstorming, story writing and dramatization, role playing games, theatrical play, peer tutoring, and experiential learning e.g. story narration, art, drama, doll animation, etc. Furthermore, visual aids (pictures and slides projection), conversation and work sheets were also used.

The psycho-educational program titled “Cowslip and Tobacco” was based on a fairy-tale scenario in which “Cowslip”, the insect and “Tobacco”, the plant, were the central heroes.

The story begins with Cowslip flying gaily in the countryside, when she decides to get some rest on Tobacco’s leaf. While resting, Cowslip bites a little bit of the Tobacco leaf and complains about its bitter taste and heavy smell. It is then, when Tobacco decides to tell his story (origin, ways of cultivation, use etc) to Cowslip.

The two heroes, Cowslip and Tobacco, are, then, acting as animators engaging children in various playful activities that aimed at achieving the objectives of the study. In general, the content of sessions concerned:

- Children’s acquaintance with the heroes of the story and the origin of tobacco through the fairy-tale scenario.
- Narration of the story of tobacco with the use of technology (e.g. slides regarding the processing of tobacco).
- Getting children in contact with anti-smoking messages through reading and artistic learning activities.
- Creating and communicating anti-smoking messages.
- Manifestation of anti-smoking attitude through a “contract of honor” that the children composed and signed, with the help of Cowslip.
- Children’s familiarization with passive smoking and the non-smokers’ prerogatives and rights.
- Creation of a book titled “The tobacco that became Jimmy”.

Contents, implementation methods and techniques of both SPAT and the psycho-educational antismoking activities were finalized after a pilot

study conducted on eight kindergartners. During the pilot study the internal validity of the SPAT was tested (Cronbach's $\alpha = 0.87$). All the necessary corrections were conducted based on the information collected during the pilot study.

Procedure

Before the implementation of the program, the second author (AT) visited the participating kindergartens for a whole week so that the children got familiar with her and her presence in class during lessons.

The research procedure lasted 11 weeks. The 1st and the 11th week the children were individually assessed with the use of the Smoking Perceptions – Attitudes Test (SPAT) (pre and post test respectively). This took place in a quiet room of the school and each testing was videotaped.

During the first assessment, each child was asked for his/her consent to participate in the program, which was described to it as a game. It should be noticed, here, that preschoolers are extremely willing when they get informed on the kind of collaboration they are asked to take part and are freely and easily engaged when their participation is presented to them as a game (41).

The psycho-educational preventive sessions were conducted by the second author (AT), once a week, on a regular day and time basis, and in a specially designed area inside the school. Sessions lasted 30-45 minutes and took place in the presence of the class teacher.

Statistical analysis

Thematic analysis was performed on children's answers to SPAT, which was undertaken by two researchers. Namely, all interviews were transcribed verbatim creating a numbered interview protocol for each participant. The analysis and coding of responses began with reading the transcriptions several times. Meanings seemed to cluster together and formed some patterns permitting the grouping of information. This grouping, based on the techniques of 'the categorization of meanings' proposed by Kvale led to subsequent study of the categories to obtain the

context of what had been said and its meaning (42). At this stage, five transcripts were also coded by a second outside coder to enhance credibility of coding. Agreement of 93% was obtained for the two researchers' coding, based on manual calculations of percentage of agreement for the presence of the coded theme (43).

Descriptive statistics on the categorized children's answers were performed using SPSS 15.0. Furthermore, χ^2 test was performed and a level of at least 0.05 was used to determine significance.

Results

Pre- and post-test frequencies and percentages of Smoking Perceptions–Attitudes Test (SPAT) for both experimental and control groups are presented below. The contents of the interviews are organized into the above three categories.

Familiarity and experience regarding smoking

Our results revealed that all children are aware of the smoking habit (100%). Of the 54 children, 49 (90.5%) experience ETS exposure in their close environment (family), while 77.8% stated that they have been exposed to ETS while being in a place where other people smoked. All children exposed to ETS stated that they are annoyed by this experience.

Children's perceptions about smoking

Table 1 presents children's answers (before and after intervention) to the question "why they thought some people smoked". Content analysis revealed five categories:

- "Pleasure" (e.g. "they smoke because they like it" or "to get a rest")
- "Addiction" (e.g. "because they can't stand without smoking" or "so they are not agitated")
- "Age" (e.g. "because they are old" or "because he is a daddy")
- "Image" (e.g. "to be good looking")

- “Ignorance” (e.g. “don’t know”).

As it can be observed (see table 1), after intervention, children’s answers in the experimental group were differentiated. That is, no child in the

experimental group stated ignorance and, most importantly, more than half of the children recognized “addiction” as a reason for smoking ($p < 0.05$). On the contrary, no differences were found in the control group answers, before and after intervention.

Table 1. Preschoolers answers in the question “Why do you think some people smoke?”

“Why do you think some people smoke?”	Experimental Group (N = 28)		Control Group (N = 26)	
	Pre-test N (%)	Post-test N (%)	Pre-test N (%)	Post-test N (%)
Pleasure	12 (42.9%)	12 (42.9%)	9 (34.6%)	10 (38.5%)
Addiction	0 (0%)	15 (53.6%)	1 (3.8%)	1 (3.8%)
Age	6 (21.4%)	1 (3.6%)	4 (15.4%)	5 (19.2%)
Image	0 (0%)	0 (0%)	1 (3.8%)	1 (3.8%)
Ignorance	10 (35.7%)	0 (0%)	9 (34.6%)	8 (30.8%)
Total	28 (100%)	28 (100%)	26 (100%)	26 (100%)

Table 2a. Preschoolers’ answers in the question “If those two persons (the smoker or the non –smoker) raced, which one would terminate first?”

“If those two persons (the smoker or the non –smoker) raced, which one would terminate first?”	Experimental Group (N = 28)		Control Group (N = 26)	
	Pre-test N (%)	Post-test N (%)	Pre-test N (%)	Post-test N (%)
The non-smoker	20 (71.4%)	27 (96.4%)	20 (76.9%)	20 (76.9%)
The smoker	6 (21.4%)	1 (3.6%)	6 (23.1%)	6 (23.1%)
No one	2 (7.1%)	0 (0%)	0 (0%)	0 (0%)
Total	28 (100%)	28 (100%)	26 (100%)	26 (100%)

Table 2b. Preschoolers’ justification of their answer to the question “If those two persons (the smoker or the non – smoker) raced, which one would terminate first and why?”

“Why the smoker (or the non –smoker) would terminate first?”	Experimental Group (N = 28)		Control Group (N = 26)	
	Pre-test N (%)	Post-test N (%)	Pre-test N (%)	Post-test N (%)
Strength – Health	4 (14.3%)	23 (82.1%)	8 (30.8%)	9 (34.6%)
Functionality	9 (32.1%)	2 (7.1%)	11 (42.3%)	11 (42.3%)
Ignorance	13 (46.4%)	3 (10.7%)	7 (26.9%)	6 (23.1%)
No answer	2 (7.1%)	0 (0%)	0 (0%)	0 (0%)
Total	28 (100%)	28 (100%)	26 (100%)	26 (100%)

At pre-test and after children were shown the racing track poster with the two runners and asked to indicate “which one would terminate first”, the majority of them in both experimental and control groups opted for “the non-smoker” (see table 2a). At the post-test, the percentage of children in the experimental group raised up to 96.4% for the “non-

smoker” while no differences were found in the control group.

Children were then asked to justify the answer given in the previous question. The ways in which they rationalized their answers were very interesting. Content analysis revealed three justification categories (see table 2b):

- "Strength – Health" (e.g. "because he is stronger" or "because he is not coughing", when suggesting that the non-smoker would win)
- "Functionality" (e.g. "the smoker will be delayed because he holds the cigarette package and the other person will overtake him" or "the smoker will stop to shake the cigarette's ash and the other person will run ahead")
- "Ignorance" (e.g. "don't know")
- "No answer".

As presented in table 2b, after the intervention the majority of preschoolers in the experimental group were able to associate the racer's performance with his/her smoking habit ($p < 0.05$). Such changes were not found in the control group.

Children's attitudes and behaviors towards smoking

To explore their attitudes and behaviors towards smoking, children were asked to state, "what they did when they were in a place where people smoke". The answers given were divided in four categories, as presented below (see table 3):

- "Passivity" (e.g. "I do nothing" or "what can I do, they don't listen to me")
- "Activation" (e.g. "I shout to make them stop" or "I leave and go to the other room and close the door behind me")
- "Exhibition of physical reactions" (e.g. "I cough" or "my eyes tingle")
- "Ignorance" (e.g. "don't know").

Table 3 shows that after the intervention, most children in the experimental group appeared more active regarding ETS exposure, showing that they were willing to take action to protect themselves from ETS exposure ($p < 0.05$). No differences were observed in the control group.

In the question with the picture of a little monkey smoking a cigarette where children were asked to state "What they would say to the monkey, had they

met", children's answers were divided into four categories according to their content (see table 4):

- "Annoyance" (e.g. "get out of here, you smell bad" or "you smell of smoke!")
- "Advise" (e.g. "animals don't smoke" or "if you smoke, you will get sick" or "take the cigarette out of your mouth")
- "Ignorance" (e.g. "don't know")
- "No answer".

According to post-test results, the great majority of the children in the experimental group would act as advisors, so as to help the monkey to quit smoking while at pre-test assessment less than half were interested in acting as advisors ($p < 0.05$). Regarding children in the control group, although more than half of them reported that they would act as advisors, no important changes were found in their post-test results, as presented in the table 4 below.

In the question about where they would seat a smoker and where a non-smoker in the train, all children (100%) placed the smoker away from the non-smoker. When asked to justify why they placed the smoker away from the non-smoker, they gave various explanations, which were divided in four categories (see table 5):

- "Protection" (e.g. "so that the other person will not get sick" or "so that he/she will not rub his/her eyes")
- "Annoyance" (e.g. "he/she will bother" or "he/she will smell bad" or "he/she will smell of smoke")
- "Hazardousness" (e.g. "if he/she sits close to the engine, the train will blaze up")
- "Ignorance" (e.g. "don't know").

After implementation of the program, the percentage of preschoolers in the experimental group that appeared to care about the non-smokers' health rose more than 50%, showing that they became more sensitive to matters relating to ETS exposure ($p < 0.05$). On the contrary no noticeable differences were observed in the control group (see table 5).

Table 3. Preschoolers' answers in the question "What do you do when you are in a place where people smoke?"

"What do you do when you are in a place where people smoke?"	Experimental Group (N = 28)		Control Group (N = 26)	
	Pre-test N (%)	Post-test N (%)	Pre-test N (%)	Post-test N (%)
Passivity	10 (35.7%)	1 (3.6%)	5 (19.2%)	5 (19.2%)
Activation	14 (50.0%)	22 (78.6%)	17 (65.4%)	17 (65.4%)
Exhibition of physical reactions	4 (14.3%)	5 (17.9%)	3 (11.6%)	4 (15.4%)
Ignorance	0 (0%)	0 (0%)	1 (3.8%)	0 (0%)
Total	28 (100%)	28 (100%)	26 (100%)	26 (100%)

Table 4. Preschoolers' answers in the question "What would you say to the monkey had you met?"

"What would you say to the monkey, had you met?"	Experimental Group (N = 28)		Control Group (N = 26)	
	Pre-test N (%)	Post-test N (%)	Pre-test N (%)	Post-test N (%)
Annoyance	9 (32.1%)	3 (10.7%)	6 (23.1%)	6 (23.1%)
Advise	13 (46.4%)	25 (89.3%)	17 (65.4%)	18 (69.2%)
Ignorance	4 (14.3%)	0 (0%)	2 (7.7%)	1 (3.8%)
No answer	2 (7.1%)	0 (0%)	1 (3.8%)	1 (3.8%)
Total	28 (100%)	28 (100%)	26 (100%)	26 (100%)

Table 5. Preschoolers' answers in the question "Where would you seat the smoker and where the non-smoker in the train?"

"Where would you seat the smoker and where the non-smoker in the train?"	Experimental Group (N = 28)		Control Group (N = 26)	
	Pre-test N (%)	Post-test N (%)	Pre-test N (%)	Post-test N (%)
Protection	2 (7.1%)	17 (60.7%)	5 (19.2%)	6 (23.1%)
Annoyance	14 (50.0%)	10 (35.7%)	11 (42.3%)	12 (46.2%)
Hazardousness	3 (10.7%)	1 (3.6%)	4 (15.4%)	5 (19.2%)
Ignorance	9 (32.1%)	0 (0%)	6 (23.1%)	5 (19.2%)
Total	28 (100%)	28 (100%)	26 (100%)	26 (100%)

Discussion

There is an ancient Greek saying which states "prevention is better than cure". Nowadays, the demand for prevention and health promotion actions appears to be vital due to the variety of diseases that people are faced with in their lifespan.

The objective of the present study was the design, implementation and evaluation of an anti-smoking preventative psycho-educational program addressed to preschool children.

Although, there are programs implemented in primary and secondary schools (3,31,32,44-47), the implementation of anti-smoking prevention programs in preschool children is extremely limited. In the mid-

80's, Parcel, Bruhn and Murray (48) found that preschool children who were taught the Preschool Health Education Curriculum expressed significantly less intention to smoke in the future. In another study, Philips, Longoria, Parcel and Ebeling (49) found that, after the implementation of their program in preschoolers, twice the number of children expressed their intention to take action in order to protect themselves from passive smoking.

According to our findings, and in agreement with other studies (50) preschoolers were familiar with the habit of smoking. Moreover, the majority of the children who participated in our study (90.5%) were exposed to ETS. In another study conducted in Greece, it was found that 73% of children aged up to

14 years old were exposed to ETS (51). All children exposed to ETS in this study stated that this was a nuisance to them. Similarly, Woods, Spriggett, Porcellato and Dudill (52) found that 90% of the children 4-7 years old were annoyed when they were in a smoky area. Porcellato, Dugdill and Springett (53) have also revealed that young children (4 to 7 year-olds) express a negative disposition towards smoking.

Post-test assessments revealed considerable changes in the children's perceptions, attitudes and behaviors towards smoking. More precisely, after the implementation of the program, most preschoolers in the experimental group were able to recognize that smoking is a form of addiction that causes serious health problems. Likewise, Porcellato et al (53) found that children of this age can refer to the negative effects of smoking. After the implementation of our program, children in the experimental group appeared to be more sensitive regarding ETS and more willing to take action to face the problem. This is in concordance with Philips et al (49), who found that after their prevention program the children were more likely to protect themselves from ETS.

As regards children's behavior towards smokers, after the end of the program, preschoolers in the experimental group declared that they would prefer acting as advisors towards a smoker.

This strengthens the finding that children in the experimental group were able to perceive smoking as an addictive behavior, thus, non-smokers should counsel smokers on the hazards of this habit, rather than be just being negative and hostile.

Research has revealed that even very young children have their views about smoking, and, therefore, such intervention programs should be suitable in the preschool education level (50,52,54). Woods et al (52) found that as elementary school children grow older, they express more positive ideas towards smoking than younger ones, and, thus, children under 6-7 years old would be more receptive to information about the negative aspects of smoking. According to Greenlund et al (55) health behaviors are established at an early developmental stage and are difficult to change, once they are adopted. Therefore anti-smoking programs should be implemented as early as possible. The results obtained in this study suggest that health educators and early

education experts should begin implementing smoking prevention programs at nursery school level, in an attempt to help children develop the necessary skills and adopt negative attitudes towards smoking. This has been suggested by other experts as well (56,57).

To summarize our results, it seems that children, as young as preschool-aged, are capable of receiving anti-smoking preventive interventions, in order to be 'inoculated' with negative attitudes towards smoking. However, these programs should be designed specially for preschool children, since they are a very sensitive age group with certain developmental capabilities and educational needs.

Finally, the limitation of the study described is the small number of participating children in both experimental and control groups. This fact is evidently affecting the generalizability of the study. In an attempt to come up with more reliable results regarding the effectiveness of the program, a further project has already been designed which will involve the implementation of the program in larger numbers of pre-school children, together with a four-year follow-up study.

Conclusions

The evaluation of our preventive psycho-educational program revealed that it is an effective antismoking program to be used with kindergartners. It is essential, however, that others carry out similar research to support our findings. In addition, longitudinal randomized control trials are also necessary to determine the best methods of promoting antismoking attitudes and behaviors in young children.

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Appendix: The Smoking Perceptions – Attitudes Test (S.P.A.T.)

Name.....

Place of testing.....

Address.....

	Day	Month	Year
Date of testing			
Date of birth			

1 st Subject	Distinguishing smokers from non-smokers ¹		R / W / NA ²
Perceptions	Q ³	Point to me which person is a smoker and which is a non-smoker in these pictures	
	A ⁴		

2 nd Subject	Familial environment		NA
Perceptions	Q	Is there anybody at home who is a smoker? (If Yes, we ask Who?)	
	A		

If the child's answer to the above is No, then we move on to the third subject otherwise we move on to the 4th subject.

3 rd Subject	Broader Social Environment		NA
Perceptions	Q	Have you ever been to a place where people smoked?	
	A		

4 th Subject	Personal Judgment		NA
Perceptions	Q	“Why do you think some people smoke?”	
	A		

¹ Picture a accompanies the question.

² R=Right, W=Wrong, NA=No Answer

³ Q=Question

⁴ A=Answer

5 th Subject	Myself and Smoking		NA
Attitudes	Q	Is there anything, which annoys you when people smoke? If Yes, What is it that annoys you?	
	A		

If the child's answer to the above is No, then we move on to the 7th subject

6 th Subject	Myself and Smokers		NA
Intentions / Attitudes	Q	What do you do when you are in a place where people smoke?	
	A		

7 th Subject	Endurance ⁵		NA
Perceptions	Q	If those two persons raced, (the smoker or the non –smoker) which one would terminate first and why?	
	A		

8 th Subject	Aesthetics ⁶		NA
Perceptions	Q	Why do you think these people are holding their noses?	
	A		

9 th Subject	My own assessment ⁷		NA
Perceptions/ Attitudes	Q	Where would you seat the smoker and where the non-smoker in the train?	
	A		
10 th Subject	I express my own position ⁸		NA
Intentions / Attitudes	Q	What would you say to the monkey had you met?	
	A		

Remarks

.....

⁵ We show to the child poster 1 which accompanies the test.

⁶ Picture b accompanies the question.

⁷ We show children Poster II.

⁸ Picture c accompanies the question.

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National survey 2002 on medical services for persons with intellectual disability in residential care in Israel

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Abstract

In Israel, the Office of the Medical Director of the Ministry of Social Affairs is responsible for the medical service in residential-care centers for persons with intellectual disability (ID). During 1997-1998 a standard annual questionnaire was developed and the first national survey study conducted in 1998. This present paper presents the findings of the fifth national survey in 2002, for which the following information was gathered via questionnaires: information on the age, gender, and level of intellectual disability of persons served at the residential care center in question, status of the population served, profile, nursing, medical, and allied professional staff, number of annual examinations, preventive medicine aspects, medications, number of annual cases of infectious disease, annual unintentional injury, number of deaths, number of hospitalizations, internal residential center hospitalization, ambulatory out-patient use, use of outside laboratory examinations and dental care. In 2002, 6,352 persons were served in nine government, 36 private and 12 public centers. The average number of persons per center was 111.44 (range 16 to 398). Of the patient population, 78.4% were between 20 and 60 years old, 50.4% had severe or profound intellectual disability, and 41.9% moderate disability. 25% were nursing patients, 18.7% were confined to a wheelchair, 28.9% suffered from epilepsy. Of the total population, 80.3% were receiving medication daily for chronic illness and 50.8% received psychotropic medication.

Keywords: Intellectual disability, developmental disability, mental retardation, residential care, long term care, nursing, Israel.

Introduction

In 1997 it was decided to develop an instrument to monitor the health service for people with intellectual disability living in residential care centers in Israel and conduct annual surveys (1-4). We want to continue to improve our service to this population and

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the data provided each year will guide us in our work. This paper describes the findings from the fifth annual survey in 2002.

Methods

The questionnaire developed for the residential care centers have the following sections: age, gender and level of ID of persons served at the care center in question; the status of the population served (educational, treatment, rehabilitation; nursing, challenging behavior); profile (various aspects of the nursing load like number of persons with gastric tubes, catheters, gastrostomy, dialysis, oncology, epilepsy, diabetes, hypertension, blindness etc); nursing, medical and allied professional staff; number of annual examinations; preventive medicine aspects; medications; number of annual cases of infectious disease; annual unintentional injury; number of deaths; number of hospitalizations; internal residential center hospitalization; ambulatory out-patient

utilization, utilization of outside laboratory examinations, and dental care (1). The questionnaire was sent to each residential care center in Israel with a medical clinic to survey the activity of the clinic for the 12-month period of 2002.

Results

Questionnaires were received from all 55 residential care centers (100% response rate). In the year 2002 there were nine government, 36 private and 12 public (not-for-profit) centers serving a total of 6,352 persons (see table 1). The average number of persons per center was 111.44 (range 16 to 398). The level of ID or mental retardation (MR) in the population of persons with ID in residential care centers is shown in table 2. Mild ID: IQ 55-70; moderate: IQ 35-54; severe IQ 20-34; and profound: IQ < 20. Other refers to 21 persons who were placed for other reasons.

Table 1. The population of persons with intellectual disability in 55 residential care centers in Israel, 2002

Age (yrs)	Males	Females	Total	Percent
0-9	100	69	1697	2.66
10-19	475	372	847	13.33
20-39	1,589	1,078	2,667	41.99
40-49	721	691	1,412	22.23
50-59	463	436	899	14.15
> 60	1667	192	358	5.64
TOTAL	3,514	2,838	6,352	100.00

Table 2. The level of intellectual disability in persons in 55 residential care centers in Israel, 2002

Age (yrs)	Mild	Moderate	Severe	Profound	Other Total		Percent
0-9	3	11	98	57	0	169	2.66
10-19	42	302	354	146	3	847	13.33
20-39	169	1,009	1,017	466	6	2,667	41.99
40-49	132	680	456	136	3	1,407	22.23
50-59	95	458	256	85	4	898	14.15
> 60	28	200	92	39	5	364	5.64
TOTAL	469	2,660	2,273	929	21	6,352	100.00
Percent	7.38	41.88	35.78	14.63	0.33	100.00	

In table 3 is shown the profile of the population. There were 1,392 nursing patients and 207 intensive nursing care patients. Educational category is the term for persons with a level of self care, social skills, and ability to work. Treatment category is a person with normal-to-moderate self-care functions and social skills, able to accomplish simple tasks and skills in a limited number of activities. Rehabilitation category is for a person with poor adaptive skills, in need of support, instruction, and assistance. Challenging behavior means persons that are hyperactive and in need of constant supervision. The total population in residential care centers is very much in need of nursing care, and the medical profile or medical/nursing problems can be seen in table 4.

Table 3. Profile of the population in residential care 2002 according to educational, treatment, rehabilitation, nursing and challenging behavior

Profile	Numbers	Percent
Educational	675	10.63
Treatment	1,456	22.92
Rehabilitation	372	5.86
Nursing	1,392	21.91
Intensive nursing	207	3.26
Challenging behavior	2,250	35.42
TOTAL	6,352	100.00

In residential care centers there is a need for a multidisciplinary staff, which will provide medical, nursing, and allied health professional service to this population, and the number of full-time equivalent positions is shown in table 5. In each residential care center, a regular clinic is held daily, providing not only treatment to patients with complaints or problems during the previous night in need of examination, but also routine health surveillance. Table 6 shows the number of examinations for the year 2002. Blood is also drawn in the residential care center, but sent out to laboratories run by the local area health maintenance organizations (HMOs). Preventive medicine is an important aspect of the practical work in residential care centers with some shown in table 7.

In this population, 80% were in need of daily medication (see table 8), 31% received anti-epileptic drugs, and 51% psychotropic medication. Daily medication is usually given three times per day, but

for acute situations (usually challenging behavior) extra medication is given (SOS).

Table 4. Nursing profile of the population in residential care, 2002 (N=6,352)

Profile	Numbers	Percent
Gastric tube feeding	19	0.30
Urinary catheter	18	0.28
Gastrostomy	135	2.13
Pressure sore (decubitus)	59	0.93
Dialysis	9	0.14
Oncology treatment	41	0.65
Down syndrome	581	9.15
Fragile X	68	1.07
Epilepsy	1,836	28.90
Diabetes mellitus	253	3.98
Hypertension	329	5.18
Asthma	131	2.06
Phenylketonuria (PKU)	19	0.30
Self injurious behavior (SIB)	216	3.40
Blindness	292	4.60
Wheelchair users	1,187	18.69

Table 5. Medical and allied professional staff in 55 residential care centers, 2002

Profession	Number of equivalent full-time positions
Physicians	36.50
Chief nurse	25.75
Other nurses	243.56
Psychiatrist	14.05
Other medical specialist	4.53
Pharmacist	3.24
Physiotherapist	43.16
Communication and speech therapist	14.67
Nutritionist	9.32
Medical secretary	4.25
Occupational therapist	20.83

Table 6. Number of examinations at the 55 residential care centers in 2002

Examination/treatment by	Total 2002	Exams/person with ID/y
Physician	104,532	16.46
Psychiatrist	20,216	3.18
Other physician	5,515	0.87
Physiotherapist	94,260	14.84
Blood test, urine, stool, other	23,412	3.69

Table 7. Preventive medical aspects in 55 residential care centers, 2002 (N=6,352,2,838 females)

Measure	Number	Percent of population
Influenza vaccination	5,423	85.37
Hepatitis B vaccination	305	4.80
Hepatitis A vaccination	24	0.38
Breast examination (females)	823	29.00
Gynecological examination (females)	1,013	34.37

Table 8. Medication for persons with intellectual disability in residential care, 2002 (N=6,352)

Type of medication	Number	Percent
Chronic medication	5,098	80.26
AED (for epilepsy)	1,967	30.97
Psychotropic	3,225	50.77
Oral contraception	88	3.10 (female population)
Depo-Provera	320	11.28 (female population)
SOS	6,814	

Table 9. Infectious diseases in 2002

Disease	Number of cases
Septicemia	3
Salmonellosis	2
Shigellosis	3
Scabies	785
Lice	112
Other	56

Table 10. Emergency room visits and hospitalizations in 55 residential care centers in 2002 (6,352 persons)

Activity	Number	Days	Rate per 1,000
Emergency room	1,569	0	247.01
Internal medicine	535	3,206	84.23
Pediatrics	140	955	22.04
Surgery	163	887	25.66
Other	152	822	23.93
Total somatic hospitalization	990	5,870	155.86
Psychiatric hospitalization	31	452	4.88
Total hospitalization	1,021	6,322	160.74
Internal institutional Hospitalization	145	3,679	22.83
Total external and internal hospitalization	1,166	10,001	183.56

Infectious disease is often seen in this population. Some statistics can be seen in table 9 for 2002.

The medical clinics in the residential care centers are usually staffed with nurses (most are still practical nurses) 24 hours every day. The physician makes visits during the day, but is not on call and therefore, the medical clinic at the residential care center may send the resident to the emergency room or for hospitalization, whereas several residential care centers have a small number of beds for observation (called internal institutional hospitalization in table 10). Emergency and hospital utilization in 2002 is shown in table 10. The physician in each residential care center is usually a family physician or a physician without specialization for the adult population and a pediatrician for the pediatric population. The number of specialist referrals outside the residential care center in 2002 is shown in table 11, and the number of special examinations in laboratories or clinics outside the residential care center is shown in table 12. It should be noted here that ECG is also done in the centers, where they have the equipment available. The nursing staff will often have to be involved to explain to and calm the resident and sometimes to follow and participate with the resident at the out-patient clinic, dental visit, or

during hospitalization. Another aspect of the medical is dental surveillance and treatment.

Table 11. Use of ambulatory services outside residential 55 residential care centers in 2002 (6,352 persons). Numbers and rate per 1,000 study population

Type of service	Visits in 2001	Rate/1,000
Surgery	740	116.5
Internal medicine	78	12.3
Eye	1,274	200.6
Optometrist	250	39.4
Dermatology	849	133.7
Orthopedics	841	132.4
Gynecology (females)	721	254.1
Neurology	531	83.6
Oncology	88	13.9
ENT	546	86.0
Diabetes	223	35.1
Cardiology	188	29.6
Endocrinology	258	40.6
Pulmonology	117	18.4
Child development	12	1.9
Urology	499	78.6
Gastroenterology	228	35.9
Auditory	84	13.2
Proctology	39	6.1
Rehabilitation	82	12.9
Vascular	62	9.8
Hematology	94	14.8
Physiotherapy	101	15.9
Plastic surgery	100	15.7
Oral surgery	206	32.4
Hemodialysis	594	93.5
Psychiatrist	64	10.1
Other	140	22.0
TOTAL	9,009	1,418.29

The number of dental visits for 2002 is shown in table 13. People with intellectual disability or challenging behavior who live in residential are prone to injuries. Each injury (intentional, unintentional, or a case of death) must be reported to the medical director.

Table 12. Use of ambulatory laboratory services outside 55 residential care centers in 2002 (6,352 persons). Number of examinations and rate per 1,000 study population

Type of laboratory	No. exams	Rate/1,000
Chest X ray	468	73.7
Other X ray	692	108.9
Ultrasound	675	106.3
ECG	381	60.0
EEG	252	39.7
Mammography	273	42.98
ECHO	117	18.4
CT	197	31.0
MRI	17	2.7
Other	64	10.1
TOTAL	3,136	497.9

Table 13. Dental treatment (examination, hygienist and general anaesthesia) for all persons in 55 residential care centers in 2002 (N = 6,352)

Examination	Numbers	Percent
Dental examination	7,043	110.88
Dental hygienist	6,298	99.15
Treatment under GA	234	3.68

Discussion

The Office of the Medical Director (OMD) of the Division for Mental Retardation at the Ministry of Social Affairs (MSA) provides medical services for persons with intellectual disability (ID) in residential care centers in Israel. The OMD sets the standard of care, and a medical/allied professional health team carries out inspections and supervision to staff at the local institutional level.

This situation is different from that in many other countries, where large institutions have been closed and supervision de-centralized. Israel has never had large institutions like those in the United States, but rather smaller centers having an average of 111 persons per center. Only about 27% of the total registered population of persons with ID (in 2002 the total registered population was 23,340 persons) reside in this manner, whereas the majority remain at home,

but receive services from the Division for Mental Retardation.

Table 14. Reported cases of injuries from 55 residential care centers in 2002 (N=6,352)

Injury	Numbers	Percent of population
Death (unintentional injury)	17	0.27
Burns	40	0.63
Fractures	116	1.83
Wounds	825	12.99
Runaway	205	0.31
Care staff injured resident	3	0.05
Resident injured other resident	127	2.00
Abuse of resident	2	0.03
Drowning	1	0.02
Other	181	2.85
TOTAL	1,332	20.97

Table 15. Cause of death for 85 cases in 55 residential care centers in 2002

ICD Classification	Numbers
1. Infectious	12
2. Neoplasms	5
3. Endocrine	0
4. Blood	0
6. Nervous system	4
7. Circulatory	31
8. Respiratory	18
9. Digestive	0
10. Genitourinary	2
14. Congenital	0
16. Ill-defined	9
17. Injury	4
TOTAL	85

The present survey is the fifth on a national basis in Israel conducted to obtain a picture of the population served and to analyze trends in service provision. The survey in 2002 showed that 78.4% of the population with ID in residential care in Israel was between 20 and 60 years old, 50.4% with severe or profound ID, 41.9% with moderate and 7.4% with

mild ID. This distribution, because the persons with ID who can be served outside of the residential care framework will be served in the community. Twenty-five percent were nursing patients, with a high workload for the care staff, and 18.7% confined to a wheelchair. The present survey showed 28.9% with epilepsy, which is much higher than the usual 0.5% to 1% in the general population (5) but has been reported in other studies (6,7), where the prevalence of epilepsy in residential care was around 32%. For community studies with persons with ID, the prevalence was lower—around 16% (6,7).

This population of persons with ID in residential care has many associated medical problems and therefore a higher prevalence of daily medication. In this survey, 80.3% were found to be receiving medication daily for chronic illness, and 50.8% received psychotropic medication for psychiatric illness. Ambulant (out-patient clinics) or specialist service in this survey showed that the sub-specialties of ophthalmology, dermatology, orthopedics, surgery and gynecology were the most requested specialist visits. Dental care and hygiene are very important in this population. Most of this population was examined by a dentist and over time, we have seen an increase to 99% that are now treated by dental hygienist.

Conclusions

This paper is a report on the fifth national survey on medical care for persons with intellectual disability in residential care centers in Israel. We have observed over time that the information gathered has been very helpful for the planning and development of services. The questionnaire has resulted in a uniform data collection that is important for not only the Office of the Medical Director, but also for the clinic itself, the local administration of the specific residential care center, and the Division for Mental Retardation in particular.

Acknowledgments

We thank the medical and nursing care staff of all residential-care centers for their time and efforts to fill out the questionnaire and collect the data.

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Short Communication

Black market medicine: An ethical dilemma in Israel

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Abstract

Black market medicine contradicts the ethical and moral codes obligating every physician to act ethically and not accept bribery for care provided or to accept compensation for a service that should be provided equally and without charge. The phenomenon is not new and has been described by various professionals working within the health and medical system in Israel. This paper is a short overview of black market medicine. We believe that if physicians are made aware of the issue of black market medicine and its immorality, emphasizing the harm that it causes them and the entire population due to its avaricious portrayal, perhaps in the future this practice will be reduced and more easily eliminated.

Keywords: Public health, medical ethics, professional ethics, Hippocratic oath.

Introduction

The prevalence of black market medicine in Israel is extensive. This practice is in contradiction with the Patient's Rights Act from 1996, chapter C, clause 3-4, which states that "every person in need is entitled to receive medical care in accordance with all laws and regulations and the conditions and arrangements reigning at any given time in the Israeli health care system" and "no medical facility or clinician shall discriminate between patients on grounds of religion, race, sex, nationality, country of birth, or other such grounds."

The existence of black market medicine is troublesome for the Israel Ministry of Health and a black stain on the white gown of the medical profession. Black market medicine contradicts the ethical and moral codes obligating every physician to act ethically and not accept bribery for care provided or to accept compensation for a service that should be provided equally and without charge.

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The phenomenon is not new and has been described by nurses working at the largest hospital in Israel (1), who called it immoral medicine. They described (1) that nurses have been exposed to many instances of immoral medicine in hospitals, where they have observed demands for money from patients who are waiting for surgical intervention and physicians accepting bribes or financial compensation in return for their services.

We have decided to review this subject, since we also have encountered this phenomenon of physicians, who are financially compensated by patients for health care services for which they are already paying as members of the HMOs. This practice is prevalent in almost all hospital departments and expressed by the concept of the “department fund” – insinuating to the patient, “that should you wish to receive prompt treatment or to expedite surgery, or should you wish to order the services of a specific surgeon, you are expected to deposit money in the fund”. Black market medicine in the hospitals is also expressed by donations, including gifts to the staff, patients who organize staff outings, purchasing equipment for the wards, etc. This issue is very significant and it has a great deal of influence on the nature of medical care. For this reason we should be aware of it, discuss it, and examine why it is surrounded by a conspiracy of silence.

What is black market medicine?

The definition provided by the Knesset (the Israel Parliament) in the bill prohibiting black market medicine as an amendment to the Health Care Act (prohibiting the acceptance of payments, clause 10B): “A public health care worker or institution may not request or accept, whether directly or indirectly, any payment in return for the provision of health care or any service that are part of the worker’s duties, unless this payment is made through a public health care institution or with its consent. Said payment includes money, money equivalent, services, or any other benefit”.

In the legal directory black market medicine is defined as a white-collar crime. This term includes various types of illegal and nonviolent behavior performed by groups or individuals and including

theft, fraud, and other violations of trust, which are performed during the rendition of the offender’s professional activities (for example: fraud, bribery, violations of anti-monopoly laws, price adjustment, manipulation of the capital market, inside trading) (2). Further legal explanation can be given as using special resources (positions, assets, and political influence) to generate illegal profits by means of disguise and deception and while preventing exposure by controlling sources of information. At the same time, the legal definitions of these prohibitions create a conspicuous obscurity that makes it difficult to differentiate between a criminal act and an act that carries only civil liability.

In an investigation by the State Comptroller on the role and efficiency of the Israeli medical system black market medicine was defined as: “Medical services provided under the auspices of a public institution involving any display of preference that does not stem from medical considerations and not in the required transparent and formal manner – in return for financial or other gain provided by the patient to the physician treating him as part of his responsibilities in a public hospital.”

From an economic point of view black market medicine and black market economy has been described as a state of imbalance (3). The law determines the level of services in economic terms, but since the present level is poor a state of imbalance exists. The market must achieve a state of balance by searching for alternative products, such as private and “black market” medicine. Physicians receive significant financial compensation for providing alternative services and this complements their lack of satisfaction with the compensation received from the system, leading to illegal conduct (4). From a sociological point of view white-collar criminals do not perceive themselves, and often are not perceived by society, as criminals and deviants, but rather as honest citizens.

We see black market medicine as an extensive field related to immoral and unethical medicine, including all medical compensation expressing the relationship between caregiver and patient in a manner unrecognized by the establishment, such as department compensation or organized department fund (issuing receipts), handing the physician money in an envelope before or after an operation or after

performing a certain procedure, selecting a private surgeon by paying him, reserving beds on surgical wards, private consultations at the hospital.

Perceptions of black-market medicine

The Legislature Service Commission in Israel decided to formulate a bill defining black market medicine as a criminal offense. This is an additional attempt to fight this reality, against which all administrative means of supervision used in the last few years within healthcare institutions have been exposed as inefficient. Government service regulations concerning private employment state that physicians in government service may not accept payment from a patient in a hospital for surgery or consultation. This is also forbidden according to the labor constitution of Union (Histadrut) workers and according to the procedures of the various health care providers in Israel (HMOs).

In the public debate around this issue and the work of the commission there were recognition that a law cannot solve the problem of black market medicine and that it could cause damage to the health care system. For all intents and purposes, black market medicine is already considered bribery in criminal law (5).

The medical profession itself can also be seen as ambivalent to this issue. Both for personal reasons related to the fact of being a physician, the presence or absence of compensation (promotion, studies, research), structural causes related to the type of workplace (surgical or internal ward or other) or the physician's ability to support himself by practicing private medicine and supplement his low pay in public hospital service. So from the chair of the Israel Medical Association it was claimed that a bill prohibiting black market medicine would be a callous violation of the basic constitutional foundations of the democratic state, since "it is inconceivable that a modern state would apply a unique discriminatory penal code to a specific group of workers", while the representative of the HMOs felt that "private and public medicine should not merge within a public institution. Such a combination causes discrimination between affluent and less prosperous patients, while providing personal benefits to selected physicians."

Within the economic system black market medicine relates to the economic perspective, dividing it into a number of aspects and levels (6), where the first level is the health care budget as part of the total budget of society and level two the manner in which the medical budget is divided between various medical objectives. In his article, Benjamin Mozes (6) quoted renowned jurist Guido Calabresi, who dealt with alternative ways of distributing resources, which are on the one hand significantly limited and on the other hand related to very important matters. Calabresi offers four approaches to the question of resource allocation:

- Pure market: Resources are distributed according to a free market (each medical procedure has a price) and consumers compete with each other. People of means will always receive better care. This approach is immoral, since there are "poor people", who will not receive any care as they lack the resources to pay for it.
- Political: The state decides how resources will be divided, based on considerations, such as military service. This is similar to a democracy. The will of the people, expressed by chosen representatives for public matters, decides which treatments should receive medical priority.
- Fortuitous: The division of medical care will be decided by lottery, the moral question is whether human life should be decided by lottery.
- Customary practice: According to this approach, society decides not to decide tragic matters, i.e. nature is permitted to take its course. Social powers, pressures, coincidence, different behavior when visiting physicians, form a distribution of the limited resources. The disadvantage of this approach is that the moment a person understands it he objects to it when it is not in his favor.

In order to regulate and have exceptions medical services is now provided as part of a complementary insurance policy and special medical services that are not included in the basket of health care services can be paid for on condition that the compensation is paid

directly to the hospital management. This service will be a more efficient use of existing infrastructure, such as operating rooms and cardiac catheterization rooms and will cause more senior and professional physicians to remain at the hospitals and thus be available to care for patients (5). This AMS (Additional Medical Service) has so far only been implemented in a few hospitals.

Legal struggle

The low level of exposure and punishment in regard to black market medicine is not surprising. In the current state of the medical system, black market medicine is a social need offense (an offense contrary to the economic situation), similar to violations of the alcohol prohibition in the “dry years” of the United States. As such it satisfies needs of both the offender and the “victim” and thus both sides possess a vested interest in preventing exposure. In the few cases in which the practice was exposed, additional factors were at play, such as poor objective outcomes of the treatment, together with a sense of medical malpractice or an intention to harm to the victim. The current deterring punishment should be a prison term.

Since the offense is basically financial, another possible deterrent would be heavy fines, which would neutralize profits. However the value of such fines would also be limited due to the low level of exposure. We must also remember that punishing a black market medicine offender does not end with the penalty imposed by the criminal system. There are supplemental penalties that hold serious implications, such as the possibility of revoking or suspending the physician's license to practice medicine in cases of criminal conviction, administrative removal from senior positions (head of department, assistant head of department, senior physician) and even dismissal with slim chances of being employed by other public employers. A primary fact regarding “social need offenses” is that they cannot be stopped by administrative or legal means. These offenses are not the main problem, rather only symptoms of another, more deeper illness, and until it is treated no real remedy is possible.

The Ministry of Health support the organized implementation of the AMS system, since there is a

demand for this service and the public wishes to determine the identity of the surgeons operating on them. It is time to stop ignoring the obvious, to acknowledge changing needs and to prepare for them accordingly in order to determine uniform rules and prevent distortions.

Operating an additional medical service will enable more efficient utilization of expensive equipment and installations, increase the availability of physicians and staff for the public system in the evening and night hours as well, and enable final elimination of the need for corrupt black market medicine (5). The argument against is that it is wrong to use an installation funded by the public in order to provide physicians with the opportunity to generate additional personal gain. In all modern states there is a separation of private medicine from public medicine (5).

Conclusions

From a professional point of view, members of the medical staff provide a unique service and must maintain neutrality and work according to codes acquired during their training. The State of Israel strives to grant equal care to all its citizens according to the welfare model. The authority invested in the physicians comprises power, a great deal of professional knowledge, and professional judgment. In light of these conclusions, we would like to recommend a number of ways in which hospitals should handle the issue of black market medicine:

- The provision of directives and conducting of seminars for caregiving staff and physicians in all departments, emphasizing the negative implications of this practice.
- Increasing patients' awareness of the issues relating to black market medicine by publicizing the prohibition on large signs throughout the hospitals.
- Abolishing hospital “department funds” and establishing a general donation funds managed by an external element, so that only those interested in contributing will approach this fund of their own initiative.

- Another solution suggested (2) was structural changes in the health care system, such as the establishment of a public health system, that would create a balance in regard to the interests of the public, on the one hand enabling them to receive better medical treatment and on the other providing a solution to the practice of black market medicine.

We believe that if physicians are made aware of the issue of black market medicine and its immorality, emphasizing the harm that it causes them and the entire population due to its avaricious portrayal, perhaps in the future this practice will be reduced and more easily eliminated.

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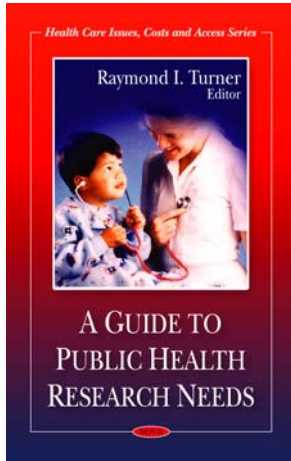
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A GUIDE TO PUBLIC HEALTH RESEARCH NEEDS

Raymond I. Turner
Editor

This book from the the Centers of Disease Control (CDC) focuses on four inter-related public health areas: healthy people across all stages of life, healthy places and communities, preparedness against infectious, occupational, environmental and terrorist threats and improved global health. Protecting and improving the health and well-being of people, communities and the nation is at the heart of public health. There are many things that contribute to our accomplishing our efforts, with science and public health research heading the list. The best possible science to protect the health and safety of Americans and people around the work is the hallmark of public health. Thus, the challenges of our increasingly complex and interdependent world require new approaches to generating and disseminating the knowledge and innovation needed to promote well-being and improve health. As a step toward fostering strategic investments in public health research and science, the CDC, in consultation with the public and a wide range of partners, has developed this comprehensive guide, *Advancing the Nation's Health: A Guide to Public Health Research Needs*.

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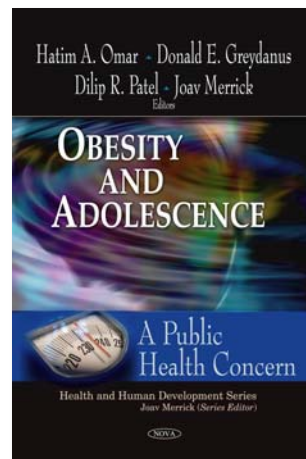
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OBESITY AND ADOLESCENCE

A Public Health Concern

Hatim A. Omar
Donald E. Greydanus
Dilip R. Patel
Joav Merrick
Editors

A mantra has developed in the late 20th century and early 21st century that has an underlying bias against overweight and obese individuals, who are blamed for their “disease” and told by society to lose weight or suffer the consequences. Art was used from 22,000 BC through the 19th century to glorify obesity, while art of the current era vilifies or mocks obesity. Considerable discrimination awaits the obese child, adolescent, or adult in current society, whether in the form of bullying in school, limited social life, or job refusal. Concern over obesity leads many youth to unhealthy diet practices that involve starvation and/or bulimic features. In this book, leading international experts discuss obesity in adolescence.



Indeed, what are the ethics of obesity management for the health care professionals of today? Perhaps proper obesity management begins with an examination of why obesity was desired for so many centuries, an acceptance that obesity is not the patient’s fault, that many overweight/obese individuals are happy as well as healthy and that the economics of current obesity “treatment” must be reexamined and reconfigured.

This book has been created and edited by four leading physicians in child health and human development

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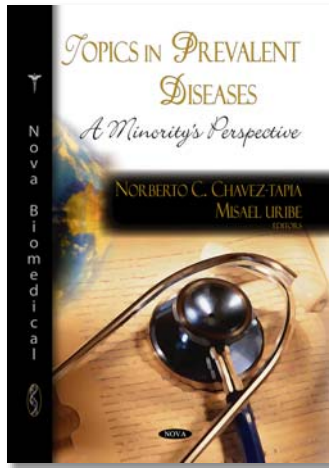
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X. INDEX



TOPICS IN PREVALENT DISEASES

A Minority's Perspective

NORBERTO C. CHAVEZ-TAPIA
MISAEEL URIBE
EDITORS

This book is a new exciting editorial project designed to provide high quality information about the most important worldwide diseases considering minorities groups. The information commonly is diffuse and not always highlighted. Consequently preventive, diagnostic, and treatment issues could differ from classical (most cited) information. This a classical text for those practitioners or researchers that have interest about medical troubles in the most numerous groups of patients (all minorities). In this book you will find scientific data regarding the most imperative diseases in worldwide derived from minorities groups. Taking into consideration the information of this book you may be able to analyze with critical and constructive view the standard of care in prevalent diseases. Additionally, this could be a great opportunity for researchers to identify limitations in the available information and in the future help to solve these restrictions.

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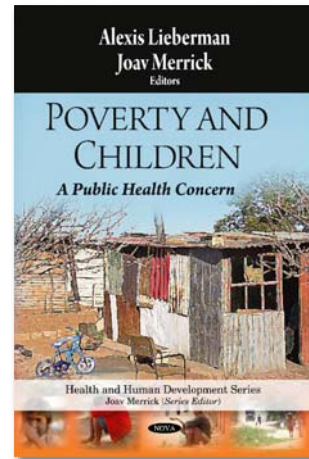
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POVERTY AND CHILDREN

A Public Health Concern

Alexis Lieberman
Joav Merrick
Editors



Poverty, while not a disease process, is well known to have far-reaching effects on the health of children and adolescents. In developing countries, poverty is associated with inadequate shelter, unsafe water and inadequate nutrition, leading to increased rates of infectious diseases, including malaria and diarrheal illnesses, as well as increased rates of infant and maternal mortality.

Even in wealthy, industrialized countries, poverty negatively impacts child health, beginning at birth with increased rates of prematurity, low birth weight and maternal depression, continuing into childhood with increased rates of asthma, dental caries, inadequate or inappropriate nutrition, along with increased exposure to trauma and abuse, violence and crime. By the time these children become teenage patients in our clinic, they have increased rates of aggression, mental health problems and delinquent behaviors, as well as lower reading and math scores and increased rates of ending their education prematurely.

For this book, edited by two leading experts, we have asked people from different parts of the world to submit contributions that focus on the comorbidities of poverty.

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Alexis Lieberman, MD and Joav Merrick, MD, MMedSci, DMSc

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