

The Adolescent Lifestyle Questionnaire: Development and Psychometric Testing

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L'article décrit l'élaboration et la mise à l'épreuve psychométrique d'un instrument destiné à mesurer un style de vie sain chez l'adolescent. On a remis le questionnaire à 292 adolescents vivant à l'est du Canada. On a testé ce questionnaire en utilisant une analyse d'items, une analyse factorielle et des mesures de fiabilité. L'analyse factorielle a isolé sept dimensions pour un style de vie sain chez l'adolescent; cela représentait 56 % de variance dans la mesure des 43 énoncés. Les sept facteurs comprenaient : la conscience de son identité, la nutrition, l'activité physique, la sécurité, la conscience de sa santé, le soutien social et la gestion du stress. Le coefficient Alpha de fidélité sur l'échelle totale est de 0,91; les coefficients Alpha pour ce qui a trait aux sous-échelles varient entre 0,60 et 0,88. Cet instrument justifie d'autres tests et une élaboration plus poussée auprès d'autres populations adolescentes. Il permettra aux chercheurs d'étudier les types de style de vie chez les adolescents et d'évaluer l'effet des interventions sur les changements dans le style de vie de cette population.

This paper describes the development and psychometric testing of an instrument designed to measure healthy lifestyle in adolescents. The Adolescent Lifestyle Questionnaire (ALQ) was tested on 292 adolescents residing in eastern Canada using item analysis, factor analysis, and reliability measures. Factor analysis isolated seven dimensions to a healthy lifestyle in adolescents, which accounted for 56.0% of the variance in the 43-item measure. The seven factors were: identity awareness, nutrition, physical participation, safety, health awareness, social support, and stress management. The alpha reliability coefficient for the total scale is .91; alpha coefficients for the subscales range from .60 to .88. The instrument warrants further testing and development with different adolescent populations. The instrument will enable researchers to investigate lifestyle patterns in adolescents and to assess the impact of interventions on lifestyle change in this population.

In recent years the concept of healthy lifestyle has emerged as a major variable in the nursing and health-related literature. One needs only to examine the major causes of morbidity and mortality to know that lifestyle factors are major contributors to many of today's leading health problems. This is particularly true for adolescents. If one examines the major sources of mortality during adolescence one will see that injuries, homicide, and suicide account for 75% of all deaths (Rice, 1996). Major sources of morbidity are injury and disability associated with the use of motor and recreational vehicles, sexual activity, and substance use or

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abuse (Millstein, Petersen, & Nightingale, 1993). If we limit our view of health to the absence of physical illness, adolescents might score quite high; however, if we expand the parameters of the health construct to include social, psychological, and environmental health, many deficits emerge for this group. The results of a number of studies of Canadian youth provide ample evidence that all is not well with our adolescent population (Canadian Institute of Child Health, 1989, 1994). It is alarming that adolescents are the only age group in North America for which morbidity and mortality patterns have shown no improvement in the past 30 years (Rice; Vernon, 1991). Youth are exhibiting health behaviours that place them at risk for motor accidents, suicide, unplanned pregnancies, sexually transmitted diseases, mental disorders, school dropout, and long-term health problems. These trends indicate a need for an emphasis on promoting healthy lifestyles in adolescents.

Health promotion, which attempts to both enhance wellness and diminish threats to health, is perhaps one of the most important areas for nursing to explore with adolescents (Pender, 1996; Tanner, 1991). It is important that we foster informed and positive health-related choices in youth, because attitudes and health behaviours developed in adolescence, related to diet, exercise, safety habits, and sexual practices, may have health consequences throughout adulthood and greatly influence present and future morbidity and mortality patterns (Gillis, 1994; Rosen, Xiangdong, & Blum, 1990). Nurses are in a position to encourage health promotion by assessing lifestyle patterns among youth. This is particularly true for school health nurses, community health nurses, and nurse practitioners in primary health-care settings. The assessment data could be used in helping adolescents make healthy lifestyle choices, in planning behaviour-modification interventions, and in using inner resources to enhance health status. It is in the area of aggregate-focused nursing among well populations such as adolescents that the full potential of nursing can best be demonstrated in ways consistent with contemporary health-promotion culture (Pender, Barkauskas, Hayman, Rice, & Anderson, 1992). Nursing's understanding of adolescent development and transition, and the integration of such knowledge into appropriate interventions, is central to the unique contribution of nursing in promoting health among youth.

The development of valid and reliable measures of lifestyle is an essential step in investigating and developing interventions to promote healthy lifestyles among adolescents. Few attempts have been made to develop instruments for measuring healthy lifestyle in adolescents, which is surprising given the importance of this concept for both health

promotion and disease prevention. Existing instruments tend to be excessively long, focus on health risk or hazards, lack testing for validity and reliability, or report weak psychometric properties. The purpose of this paper is to describe the development and psychometric evaluation of the Adolescent Lifestyle Questionnaire (ALQ), an instrument designed to measure the extent to which adolescents have healthy lifestyles. Healthy lifestyle is defined as a multidimensional pattern of discretionary activities and perceptions that are a part of an adolescent's daily approach to living and that significantly affect health status in a positive manner (Pender, 1996; Wiley & Comacho, 1980). The subjective reasons or motives for the behaviour are not included in the definition.

Literature Review

Several investigators have measured health behaviours and lifestyle patterns in adult populations (Ardell, 1986; Duffy, 1993; Harris & Guten, 1979; Kulbok, 1985; Pender, 1996; Walker, Sechrist, & Pender, 1987; Wingard, Berkman, & Brand, 1982), but few have studied lifestyle patterns in adolescents from the perspective of the adolescents themselves. In the adult studies, support was provided to varying extents for the lifestyle components of social relationships, good health habits related to sleep, nutrition, physical activity, and avoidance of harmful substances. According to Tanner (1991), lifestyle assessment ought to include target areas of health promotion, including nutrition, physical activity, stress management, and family planning, as well as areas of health protection, including prevention of smoking, alcohol and chemical substance abuse, exposure to environmental hazards and injury, and the spread of sexually transmitted diseases. Others have supported the contribution of these components to a healthy lifestyle (Mechanic & Cleary, 1980; Palank, 1991).

Healthy lifestyle as a construct is often divided into two categories: health-promoting and health-protecting behaviours or risk-reducing behaviours. Suggesting that health-protecting and health-promoting behaviours ought to be viewed as theoretically different, complementary components of a healthy lifestyle, Pender (1996) developed the Health Promotion Model as a paradigm for explaining health-promoting behaviour. Pender defines health-protecting behaviour as actions directed toward decreasing the likelihood of illness, health-promoting behaviour as a positive approach to living and a means of increasing well-being and self-actualization. Others define healthy lifestyle as all those behaviours over which one exercises control, including actions

that influence health risks (Ardell, 1986). Taylor (1986) defines health behaviour simply as behaviour designed to enhance or maintain health. This definition is consistent with a broad view of health and includes lifestyle choices with both proximal and distal effects on physical, mental, and social well-being. Included in this concept of health behaviour are such lifestyle choices as safe sex, proper diet, and regular exercise. It is this author's opinion that classification of a lifestyle behaviour as health promoting or health protecting depends on the state of the art of health-related knowledge and research, and is certainly subject to lack of consensus and changes in status.

For Pender (1996), the major distinction between health-promoting and health-protecting behaviour is underlying motivation. The use of motivation to distinguish between the two is a strong argument for considering both behaviours when designing an instrument to measure healthy lifestyle in adolescents. Adolescence is a period of vitality and sense of well-being when the threat of illness is almost non-existent. The motivation for adolescent health behaviour (both health-promoting and health-protecting) is the pleasure derived from them and their effects on physical attractiveness (Gillis, 1993; Mechanic & Cleary, 1980). This contrasts with the motivation for adult health behaviour; among this group the possibility of illness is real and the motivations for the two health behaviours are likely to coexist. Nursing should avoid a fragmented view of healthy lifestyle and embrace the integration of health-promoting and health-protecting behaviours in designing instruments to measure adolescent lifestyles. An integrated approach increases the scope of interventions and is a step in the direction of a holistic approach to health promotion among adolescents.

Research on adolescent lifestyle has been less extensive than that on adult lifestyle, as it is hindered by a lack of empirical measurement instruments. The several instruments that have been developed to measure adolescent health behaviours have been limited to behaviours and risk factors related to stress (Anderson, 1985), religiosity (Carson, Winkelstein, Soeken, & Brunins, 1986), and symptoms of illness (Woods, 1981), and they have focused on risk reduction rather than healthy lifestyle patterns (Donovan, Jessor, & Costa, 1991).

The literature includes reports of only three instruments for examining healthy lifestyle behaviours. Among these is the Health-Promoting Lifestyle Profile II (HPLP-II) (Walker, Sechrist, & Pender, 1987, 1995), which is a revision of the HPLP-I. It is a 52-item, six-sub-scale instrument designed to measure the following major components

of a health-promoting lifestyle: health responsibility, physical activity, nutrition, interpersonal relations, spiritual growth, and stress management. Mean scores can be derived for each subscale and for the total instrument as a measure of overall health-promoting lifestyle. Pender (1996) notes that the instrument was developed for and tested on adult populations and identifies a need for additional lifestyle assessment tools, appropriate for children and adolescents.

Muhlenkamp and Brown (1983) developed the Personal Lifestyle Questionnaire (PLQ) to measure the extent to which individuals engage in health-promoting activities. The 24-item instrument, which was developed and tested on a range of adult populations (Muhlenkamp & Sayles, 1986), has six subscales: exercise, substance use, nutrition, relaxation, safety, and general health promotion. The total score represents the sum of the subscales. Test-retest reliability analysis resulted in coefficients of .78 and .88 over four-week and three-week periods, respectively. Cronbach's alpha coefficients were calculated on two samples of adults and reported as .74 and .76. A factor analysis of the responses on 380 subjects confirmed the six subscales. While the PLQ appears to be a useful short instrument for measuring health practices in adults, some items are not appropriate for adolescents, and other, overt, adolescent behaviours are not included in the questionnaire. The investigators note that at this time they have more confidence in the total score than in the subscale scores.

The Lifestyle Questionnaire (LQ) (VanAntwerp & Spaniola, 1991) is a 30-item instrument, the content of which is based on childhood mortality and morbidity statistics and items from the University of Wisconsin-Stevens Point Foundation (1978) Lifestyle Assessment Questionnaire for adults. The LQ focuses on health promotion (11 items), injury prevention (14 items), and feelings (five items). It uses a four-category Likert-type response format. The LQ was intended to be used with school-aged children as a screening tool rather than a research instrument. It has not been used with adolescents and the authors caution that its reliability and validity have not been established (VanAntwerp, 1995).

In summary, there is a dearth of reliable and valid instruments to measure healthy lifestyle behaviour in adolescents. No lifestyle instrument has been developed for and tested with an adolescent population. A research instrument developed with adolescents as primary informants will prove invaluable in assessing lifestyle patterns and identifying health education and counselling needs for this age group.

Adolescent Lifestyle Questionnaire (ALQ)

Qualities

Qualities sought in developing the ALQ were that it (1) not be excessively long or complex, which would limit its usefulness in adolescents, (2) use a consistent response mode, to enhance simplicity and reduce potential for subject fatigue, (3) contain age-appropriate items reflective of the activities of adolescents aged 12–19, (4) focus on healthy lifestyle practices, both health-promoting and health-protecting, and (5) be based on a health-enhancement rather than a risk-reduction model.

Development and Testing

Items for the ALQ were developed from a qualitative research study using the inductive approach with a convenience sample of 30 adolescents attending a large junior/senior high school in eastern Canada. There were two broad interview questions: (1) "What does it mean to you as a teen to live a healthy lifestyle?" and (2) "What kinds of activities do teens your age do on a regular basis to keep healthy?" Interviews were audiotaped and transcribed verbatim to preserve the richness and completeness of the data. The face-to-face interviews were conducted at the school and ranged from 35 to 55 minutes. The adolescents seemed pleased to participate in the study, referring other teens to be interviewed, volunteering information, and expanding freely on the research questions.

Among the large number of statements made by the teens, factors were selected that a priori were congruent with the definition of lifestyle, including health-promoting and health-protecting activities, and were sufficiently general to apply to large numbers of adolescents. Although the conceptual definition of healthy lifestyle that guided the development of this study was not shared with the adolescents, their responses to the open-ended interview questions supported the definition. Items were developed for the ALQ guided by analysis of the qualitative interviews and a review of the adolescent and adult health-promotion literature cited above. The pilot form of the ALQ comprised 66 items in seven categories: physical participation, nutrition, safety, social support, health awareness, stress management, and identity awareness. The seven categories were considered dimensions of a healthy lifestyle in adolescents. The instrument used a five-point response format – 1 "never"; 2 "rarely"; 3 "sometimes"; 4 "often"; and 5 "almost always" – to obtain an ordinal measure of frequency of reported behaviours.

The pilot form of the instrument was tested for reliability, item clarity, and response variance. Stability and internal consistency were tested on a sample of 73 school-based adolescents over a three-week period. Results yielded a reliability coefficient of .76 for the total instrument, indicating stability. Cronbach's alpha was calculated as a measure of internal consistency. The alpha coefficient was .93 for the total instrument, indicating high internal consistency. The subscale coefficients ranged from .60 to .87. Examination of frequency distributions indicated that the full range of responses was used for the majority of items. Some items were deleted and others were edited because of student confusion over meaning and terminology. The instrument as a whole appeared to have sufficient reliability to warrant further development.

Content validity of the pilot instrument was assessed by eight nurses who had engaged in advanced study of adolescent health promotion. Four nurses were asked to rate each item using four criteria: readability, cultural relevance, age appropriateness of behaviours, and conceptual congruence of the items with the concept of healthy lifestyle. An instrument developed by the researcher employing a five-point Likert format was used for this purpose. The remaining four nurses were asked to place the items in the seven categories according to definitions provided by the researcher. Items required 75% or greater agreement – that is, three of the four had to place the items in the correct category. Items were added, deleted, and modified based on the input received from the panel of nurse experts and the adolescents in the pilot study. The resulting instrument contained 56 items.

Empirical Validation

Empirical validation of the ALQ followed the process suggested by Nunnally (1978). This included item analysis of the pool of 56 items to determine which contributed most to the internal consistency of the measure, factor analysis to define the factorial composition of the refined item pool, and reliability measures to estimate the internal consistency of the final version of the ALQ.

Sample. A stratified sampling frame was used to select a convenience sample of ($n = 350$) Grade 7 through Grade 12 students, on the basis of school and grade attended, from a large rural school district in eastern Canada. The ALQ was completed by 300 adolescents, for an overall response rate of 85%. Of the 300 questionnaires, eight (3%) were discarded because of missing data or evidence that the respondents had not taken the questionnaire seriously. Subject ages ranged from 12 to 19 years with a mean age of 15.6. Of the 292 subjects, 149 (51%) were

females and 143 (49%) were males. The majority, 275 (94.8%), were Caucasian, although other ethnic groups were represented. The sample was primarily middle class. Educational level of fathers ranged from Grade 8 to completion of post-graduate study, with the median at "some college or specialized training." Annual family income ranged from less than \$10,000 to greater than \$70,000, with the median and mode income in the \$30,000–39,000 category. Twenty-two adolescents did not respond to this item. A comparison of demographic characteristics for the school population indicated that this sample reflected the school population.

Procedure. After permission had been received from the appropriate school authorities, the study was explained to students in each grade during class. A cover letter and parent/adolescent consent form were distributed to interested students. They were asked to return the signed forms to the school office within the following 48 hours. Assurance of confidentiality of information was provided and students were told that completing or not completing the questionnaire would in no way affect their grades. The ALQ was distributed the following week, during a regular class period, to those who had consented to participate and returned the signed consent forms.

Data Analysis. The SPSS statistical package subprograms Reliability and Factor were used for item analysis, factor analysis, and reliability estimates. The frequency and distribution of all relevant variables was determined and descriptive statistics provided a profile of the sample characteristics.

Results

Item Analysis

Corrected item-total correlations were calculated both for the total scale and for each of the seven subscales in a series of analyses. At each step, items that depressed the reliability as measured by coefficient alpha of either the total scale or the subscale to which they were assigned were deleted from the item pool for that scale and the item-total correlations of the revised set were calculated. This approach was considered more useful than eliminating only those items that did not meet the criterion for observed item-total correlations. Five items were eliminated from the 56-item instrument on the basis of evaluation of the results of the item analysis. Of the remaining 51 items, 47 had item-total correlations of .25 or higher and four had correlations of between .21 and .24, levels considered acceptable by Nunnally (1978). The inter-item correlation

matrix was examined to identify items that were possibly redundant and therefore could be eliminated to shorten the instrument. No correlations above .70 were found; hence the 51 items were retained.

Factor Analysis

The remaining 51 items were subjected to factor analysis. The factor analysis was exploratory in nature, as this was the initial assessment of the construct validity of the ALQ; however, it was guided by the hypothesis that seven subscales did exist. A stepwise solution employing the principal axis factoring (PAF) extraction method followed by oblique rotation was used. PAF extraction is a form of common factor analysis which assumes that measurement error involves both a random component and a systematic component that is not unique to individual items. Consequently only common factor variance is factor analyzed in this method; error and unique variance are excluded (Ferketich & Muller, 1990; Polit, 1996). PAF was used to determine the number of independent hypothetical factors underlying the observed data. It is the most popular of the common factor extraction methods and has been used by other researchers to identify lifestyle patterns (Walker et al., 1987). Oblique rotation, which does not impose the restriction that factors be orthogonal, was used because the subscales were conceptualized as interrelated dimensions of a healthy lifestyle.

Applying Kaiser's criterion of using all unrotated factors that have eigenvalues greater than 1.00 for subsequent rotation, 10 factors were extracted and rotated. This solution explained 64.5% of the variance in the measure. Child (1970) and Walker et al. (1987) note that using Kaiser's criterion when more than 50 variables are involved may lead to the extraction of too many factors. The criterion of interpretability proved more useful in creating a meaningful factor solution. Three of the 10 factors extracted had two items and lacked sufficient reliability to serve as a subscale. Intuitively it appeared the 10 factors could be combined into seven conceptually valid subscales as hypothesized.

To define more efficiently the composition of the seven factors, eight items that did not load strongly (a loading of .45 or greater on the factor) or cleanly on a single factor were eliminated and the remaining 43 items were entered into a factor analysis with PAF extraction and oblique rotation. All items loaded on expected factors at a level of .45 or higher; two of the 43 items also loaded at the same or a slightly higher level on a factor other than the one expected. The loadings and the factor structure of the items with abbreviated item content are shown in Table 1. The seven-factor solution explained 56% of the variance of

the revised 43-item ALQ and appeared to be the most logically consistent alternative. The eigenvalues and the percentage of variance explained by each factor are presented in Table 2.

Table 1 <i>Factor Loadings and Factor Structure for the Adolescent Lifestyle Questionnaire (N=292)</i>							
Items	Factors ¹						
	1	2	3	4	5	6	7
Like who I am	.65						
Know my strengths and weaknesses	.45						
Happy and content	.72						
Look forward to the future	.64						
Set goals for myself	.55						
Examine my beliefs	.46						
My life has purpose	.75						
Try to do my best	.59						
Confident about my beliefs	.71						
Read food labels		.46					
Follow a healthy diet		.46					
Limit foods high in fat		.81					
Limit foods high in salt		.76					
Limit foods high in sugar		.84					
Choose healthy snacks		.47					
Limit junk food		.60					
Choose foods without additives		.47					
Run, take long walks, dance, or swim 3–4 times weekly			.71				
Participate in sports at school			.69				
Exercise vigorously for 30 min. x 3 weekly			.68				
Play sports 3 times a week			.81				
Wear seatbelts in automobile				.47			
Avoid doing drugs				.60			
Refuse a drive if the driver is drinking				.47			
Avoid tobacco products				.60			
Avoid alcohol				.66			
Make informed choices re sexual relationships				.45			
Use protection if sexually active				.47			

(continued on next page)

Table 1 *Factor Loadings and Factor Structure
(cont'd) for the Adolescent Lifestyle Questionnaire (N=292)*

Items	Factors ¹						
	1	2	3	4	5	6	7
Report unusual body changes					.58		
Talk to teacher or nurse							
re ways to improve my health					.67		
Read magazines about health topics					.67		
Discuss health issues with others					.67		
Discuss problems with people close to me							.65
Enjoy spending time with my friends							.72
Express my concerns to others							.68
Have good friendships with girls and guys my age							.61
If I had a problem, I would have people to turn to							.65
Can express my feelings to others							.60
If I needed help, I could turn to family, friends, teachers, coaches						.65	.63
Exercise to control my stress							.45
Use helpful strategies to deal with stress							.64
Use spiritual beliefs to deal with stress							.49
Talk to my friends about my stress						.57	.57

¹ Factors are: 1, Identity Awareness; 2, Nutrition; 3, Physical Participation; 4, Safety; 5, Health Awareness; 6, Social Support; 7, Stress Management

Table 2 *Variance Explained by Seven Factors on the
Adolescent Lifestyle Questionnaire (N = 292)*

Factors	Eigenvalue	Percent of Variance	Cumulative Percentage
1. Identity Awareness	8.24	21.1	21.1
2. Nutrition	4.38	11.2	32.4
3. Physical Participation	2.71	6.9	39.3
4. Safety	2.02	5.2	44.5
5. Health Awareness	1.66	4.2	48.7
6. Social Support	1.56	4.0	52.7
7. Stress Management	1.30	3.3	56.0

Factor 1, Identity Awareness, is the strongest factor, explaining the greatest percentage of variance of the ALQ measure. Identity is the central developmental task of adolescence (Rice, 1996) and is formed as the adolescent chooses values, beliefs, and goals in life. The task of identity formation is one of making choices by exploring alternatives and committing to roles. Identity awareness in adolescence is an ongoing process of self-reflection and change as one moves through life. Its significance as a factor in the ALQ appears congruent with the definition of healthy lifestyle used in developing the instrument. The process of identity awareness involves re-evaluating, searching, and considering alternatives, including discretionary lifestyle activities that affect health status. Factor 1 includes items concerned with reflecting and choosing values, beliefs, goals, and commitments.

Factor 2, Nutrition, includes items related to food choices and eating patterns. The development of proper eating habits during adolescence is extremely important to health status. Factor 3, Physical Participation, incorporates items related to active participation in sports, exercise, or physical activity of some kind. Factor 4, Safety, is concerned with items that relate to protecting health status by making informed choices such as wearing seatbelts, practising safe sex, and avoiding alcohol and harmful substances. This factor is increasingly important as a lifestyle factor: motor accidents represent a pernicious threat to youth, and adolescents are the only age group in North America that have shown no improvement in health status over the past 30 years, because of accident morbidity.

Factor 5, Health Awareness, includes a limited set of items related to increasing awareness of health status and promoting and maintaining health through education and consultation. Factor 6, Social Support, incorporates items concerned with affirming friendships and functional sources of support. Factor 7, Stress Management, includes items related to specific strategies for dealing with stress. The cross-loading of one item from Factor 7 on Factor 6 (I talk to my friends about my stress) and one item from Factor 6 on Factor 7 (If I needed help I would have someone to turn to such as family, friends, coaches, teachers) is understandable given that social support from family and friends may overlap with the idea of stress management, as adolescents often manage stress by turning to these familiar sources of support.

The correlations among the seven factors on the measure are presented in Table 3. The low to moderate magnitude of the correlations suggests that each factor represents a distinct dimension related to other dimensions of healthy lifestyle, without being redundant.

Table 3 *Correlations among Factors on the Adolescent Lifestyle Questionnaire (N = 292)*

Factors	Factors ¹					
	2	3	4	5	6	7
1. Identity Awareness	.24	.04	.30	.39	.57	.44
2. Nutrition		.27	.22	.35	.16	.43
3. Physical Participation			.02	.21	.09	.23
4. Safety				.07	.12	.21
5. Health Awareness					.45	.43
6. Social Support						.32

¹ Factor 7 = Stress Management

Table 4 *Internal Consistency of the Adolescent Lifestyle Questionnaire and Its Subscales (N = 292)*

Subscales	Number of Items	Alpha
Identity Awareness	9	.84
Nutrition	8	.88
Physical Participation	4	.82
Safety	7	.74
Health Awareness	4	.71
Social Support	7	.80
Stress Management	4	.60
Adolescent Lifestyle Questionnaire Total	43	.91

Reliability

The final structure of the 43-item ALQ is shown in Table 4. Internal consistencies of the total instrument and of items within each subscale were examined using Cronbach's alpha. The total instrument was found to have high internal consistency, with an alpha coefficient of .91. Alpha coefficients for the seven subscales ranged from .60 to .88. According to Nunnally (1978) and Jackson (1995), modest reliability (.70 or higher) is

acceptable in the early stages of research. Although the alpha coefficient of .60 for the stress-management subscale was lower than desired, the mean inter-item correlation for this four-item scale was .27, which is considered acceptable for a scale of this length. A Spearman-Brown correction to eight items produced an alpha coefficient of .77 for the stress-management subscale. Test-retest reliability was again examined by administering the ALQ to 65 school-based adolescents at an interval of two weeks. The adolescents ranged in age from 12 to 19 with a mean age of 15.9 years. Pearson r was .88 for the total score and ranged from .80 to .88 for the subscales.

Discussion

The goal of this research was to develop an instrument to measure healthy lifestyle practices in adolescents. The ALQ appears to be a potentially useful instrument. It was hypothesized from the qualitative interview data that a healthy lifestyle profile from the perspective of adolescents would comprise seven distinct but related components. Factor analysis and reliability supported the seven components. Reliability of the ALQ, shown by a test-retest reliability coefficient after two weeks and by internal consistencies within the subscales of the instrument, is high, indicating that the instrument is stable and that the items in each dimension are measuring related but distinct concepts. The cross-loadings of items on factors 6 and 7 indicate that stress management and social support are not as independent as other combinations of dimensions. Further study of these two dimensions in an adolescent population will help explicate their relationship.

Several of the seven ALQ dimensions are similar to three of the five high-level wellness dimensions described by Ardell (1986). Ardell's dimensions of nutritional awareness, physical fitness, and stress management are similar to three dimensions identified in the current study. Similarly, this study provides support for three additional dimensions identified by Walker et al. (1987) in the HPLP-I. The dimension of self-actualization in the latter study is similar but not parallel to identity awareness in the ALQ. The interpersonal-support factor is comparable to the social-support dimension in the current investigation, and the health-awareness factor is consistent with the health-responsibility dimension described by Walker et al. (1987).

Support was provided for a seventh dimension – safety – not described by Ardell (1986) nor Walker et al. (1987). The emergence of safety as a factor is consistent with the conceptualization of healthy lifestyle as a broader construct than that of a health-promoting lifestyle.

A healthy lifestyle, as defined for this investigation, includes both health-promoting and health-protecting behaviours. It appears that safety as a component of healthy lifestyle is an important dimension to promote among adolescents. Accidents and injuries affect young people disproportionately and are the primary cause of death for those aged 1–37 (Rice, 1996). It is well documented that major sources of adolescent morbidity include injury and disability associated with motor accidents and the consequences of substance abuse and sexual activity (Millstein et al., 1993). Hence it appears there is both intuitive and empirical support for including safety as a component of healthy lifestyle in adolescents.

Previous studies addressing the issue of interrelationships of health behaviours show that such behaviours are intercorrelated, yet no consensus has emerged regarding the number and nature of underlying dimensions (Aaro, Laberg, & Wold, 1995; Hansell & Mechanic, 1990; Mechanic, 1979). Some researchers suggest that behaviours related to avoidance of undesirable health practices (health protection) form a set of behaviours different from those related to health-enhancing behaviours (health promotion) and therefore should not be included in a measure of healthy lifestyles (Walker et al., 1987). This author suggests that personal beliefs shape our definition of the healthy adolescent and generate great divergence of opinion about what is considered a healthy lifestyle. For example, ideological differences influence whether one considers sexual abstinence part of a healthy lifestyle or whether one focuses on having teens use protection to reduce the consequences of sexual activity. Personal beliefs play a role in less controversial areas as well. These multiple overlapping perspectives of healthy lifestyle make consensus difficult to reach and point to the need for consultation with youths when lifestyle measures are being developed, to ensure that the adolescent perspective is indeed represented. Inclusion of this perspective through qualitative interviews in the initial stages of development of the ALQ is clearly a strength of the instrument.

The ALQ appears to have sufficient validity and reliability for assessing healthy lifestyle in an adolescent population. It may also be useful for exploring determinants of a healthy lifestyle in adolescents and measuring lifestyle change as a result of interventions. This use is particularly relevant given the importance of health-promotion interventions among adolescents in introducing, reinforcing, and establishing healthy lifestyle patterns, and well as in prevention. The components of a healthy adolescent lifestyle must be understood and appropriately measured if relevant research and practice interventions

are to be advanced. The ALQ has the potential to make a contribution in this area.

Development and further testing of the ALQ appear warranted. Studies with adolescents representing various socio-economic levels and cultural backgrounds, and with adolescents in urban settings, would further evaluate construct validity and establish norms. Also, street youth who are school dropouts and who will likely have different perspectives and lifestyles must be studied if we are to fully understand a healthy lifestyle in this age group. The convergent and discriminant validity of the ALQ should be tested by using it with appropriate instruments with established reliability and validity in the same study. Additional items should be developed to strengthen the stress-management subscale.

In conclusion, the ALQ, a new instrument, was designed to measure the concept of healthy lifestyle in adolescents. We have observed high levels of validity and reliability with healthy, rural, middle-class adolescents. This instrument now requires further testing with a broader range of adolescent populations.

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Acknowledgements

Financial assistance for this research was provided by the St. Francis Xavier University Council on Research and the Canadian Nurses Foundation. The author acknowledges the assistance of Winston Jackson, Ph.D., with data analysis and statistical consultation.

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Date accepted: March 1997