Ethnic and Cultural Issues in Assessing Physical Activity

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The fact that a physically active life-style is important in the prevention of many chronic diseases and conditions is well accepted. As stated in the 1996 U.S. Surgeon General's Report on Physical Activity and Health (USDHHS, 1996), physically active individuals appear to have a lower risk of various diseases and health conditions such as cardiovascular disease, hypertension, Type 2 diabetes, and obesity when compared to sedentary individuals.

Whether or not there is ethnic/cultural diversity in physical activity assessment and intervention would be of critical importance in the case where there were substantial differences in the distribution of both chronic diseases and inactivity among the various segments of the population. Unfortunately, that does appear to be the case.

The disparities in the health status of certain racial and ethnic groups as compared to the rest of the United States population has recently been documented in President Clinton's 1998 Presidential Initiative on Race entitled, One America in the 21st Century. As the document so well summarizes, "The gaps in longevity and health care access for minorities and people of color are well documented and merit presidential attention...... If our Nation is committed to the proposition that all people are created equal, our basic indicators of life and health should reflect this principle."

Likewise, minority groups are consistently found to have relatively lower physical activity levels than their majority counterparts. More specifically, minority women have been found to be among the least active subgroups in American society (Brownson et al., 1999). Figure 1 presents the findings from the Third National Health and Nutrition Examination Survey (NHANES III; 1988-1991) regarding the age-adjusted prevalence of the US population 20 years of age and older who report not participating in any leisure-time physical activity (Crespo, Keteyian, Heath, & Sempo, 1996). As can be seen in this figure, non-Hispanic white men and women reported more leisure-time physical activity than non-Hispanic black or Mexican-American men and women after adjusting for age. Similarly, two other national physical activity surveys of adults, the National Health Interview Survey (NHIS; 1985, 1990, 1991) and the Behavioral Risk Factor Surveillance System (BRFSS; 1986-1991, 1992, 1994), have mirrored the NHANES findings (USDHHS, 1996). The Surgeon General's Report (USDHHS, 1996) provided a summary of the findings of all three of these national surveys, stating that "whites had a lower prevalence of leisure-time inactivity than blacks, Hispanics, and persons categorized as other."

The obvious next question is regarding our level of confidence in the implications of the findings of these national surveys. In other words, is it true that our minority subgroups are significantly more sedentary than their white counterparts or could some of these differences noted in physical activity levels be due to measurement error? Cultural and ethnic issues may have affected the assessment of physical activity levels in these minority subgroups. Likewise, the measure of inactivity in all of these surveys was based upon leisure activity with no consideration of occupational activity.

It is possible that these methodological shortcomings are altering our perception of the overall physical activity levels in many of the US minority subgroups. In fact, these potential shortcomings are the focus of this presentation and will be explored below. Realistically, although measurement error may explain some of these activity differences, this may not completely negate the findings that minority subgroups (particularly minority
women) are among the most inactive in this country since investigations that have used objective measures of activity as well often seem to show the same trends (Aaron et al., 1993, 1995; Farrell, Kohl, & Rogers, 1987).

However, before we begin to discuss some of the cultural and ethnic differences that may affect physical activity assessment, there are two caveats that are critical to this discussion. The first involves the socioeconomic status (SES) of the various minority subgroups in the United States. We know that minorities are often over represented in the lower SES groups. It is likely that much of the differences in activity levels and health status between our minority subgroups and the white majority can be explained by differences in socioeconomic and environmental factors rather than cultural and ethnic factors (Clark, 1995; Ford et al., 1991). In fact, in racial/cultural comparisons involving any outcome variable, potential confounding by differences in socioeconomic status is a very likely possibility and must always be considered.

Returning to the three national surveys previously described (NHIS, BRFSS, and NHANES III), the prevalence of physical inactivity was found to be greater among persons with lower income and with lower levels of education (USDHHS, 1996). As a specific example, the percentage of US adults aged 18 years or older that reported not participating in any leisure-time activity by annual household income decreased as household income increased (see Figure 2; BRFSS, 1992).
The second caveat that is key to this discussion is the highly likely probability that differences exist not only among ethnic/racial subgroups but within them as well. In other words, there is every reason to believe that the environmental or personal resources that positively or negatively influence physical activity levels varies among the Iroquois, Sioux, or Pima Indian Communities or among African American subgroups in Washington DC, Alabama or California. Focusing more specifically on physical activity assessment considerations, it is likely that certain activities are performed in a variety of ways among individuals from the same ethnic/racial groups located in different geographic regions of the United States (Kriska, 1997; NIH Consensus Development Conference on “Physical Activity and Cardiovascular Health”).

Before cultural/ethnic issues that may influence activity assessment are considered, some groundwork needs to be laid regarding key elements of physical activity assessment. The first are descriptions of both energy expenditure and physical activity. Components of total energy expenditure include basal metabolic rate, which typically encompasses 50-70% of total energy, and the thermic effect of food, which accounts for another 7-10% (Ravussin & Rising, 1992). The remaining component is energy expended through various types of “physical activities” best defined by Caspersen et al. (1985) as “bodily movements produced by skeletal muscles that result in energy expenditure.” It is this later component of energy expenditure, physical activity, that we attempt to measure in most population studies.

This variable third component of energy expenditure, physical activity, is comprised of an extensive array of activities that span across an entire spectrum of intensity levels, as presented in Figure 3. At the lower end of this physical activity intensity spectrum are general activities of daily living such as bathing, feeding, and grooming. The remainder of the intensity spectrum is comprised of various sports and leisure, household activities, care taking, transportation and occupation activities that range in intensity from low to moderate and high levels. The relative contribution of each of these various types of activities to total energy expenditure in a specific population will, of course, vary depending upon the population in question.

In population studies, subjective measures such as the questionnaire have typically been used to assess physical activity because of their practicality and low cost. Often objective measures are also used in combination with the questionnaires in order to validate the subjective activity measures. Examples of popular objective measures include measures of total energy expenditure such as the doubly-labeled water technique, movement counters which initially measured frequency of movement and have progressively been modified to detect differences in speed and direction of movement; and measures that estimate physical fitness such as heart rate monitoring and graded exercise testing (Kriska, 1997).

The time frame of the various survey approaches can range from a single question about usual activity to a recall survey with a time frame of one week, one year, or even over a lifetime. Diaries and logs may require the participant to record activities over 1 day, 3-days or the past-week. Past-week recall surveys may query the frequency and duration of participation of activities performed over the past week. Questionnaires of a longer-time frame, such as 1-year, may be more likely to represent usual activity patterns and have been used extensively in epidemiologic studies. The advantage of assessing activity using a survey with a short time frame is that the estimate is less vulnerable to recall bias and is more practical to validate with objective tools than are questionnaires of a longer time frame. In contrast, assessment over a short time period is less likely to reflect “usual” behavior, as activity levels may vary with seasons, as a result of an acute illness or time commitment (Kriska, 1997).

Precise estimates of energy expenditure can not feasibly be obtained from subjective measures such as questionnaires. For that, you would need to turn to objective measures like the respiratory chamber or the doubly-labeled water technique (Ravussin & Rising, 1992). However, the estimates obtained by the activity questionnaire are valuable in relative terms, and can be used to rank individuals or groups of subjects within a population from the least to the most active. The end result is a relative distribution of individuals based upon their reported levels of physical activity that can then be examined in relation to physiological parameters and disease outcome.

In order for an accurate assessment of activity to be achieved, the assessment tool used must elicit information on the types of physical activities that encompass the greatest proportion of energy expenditure in the study population. So what types of physical activities have been shown to be popular in some of our ethnic/racial groups?
Occupational Activity:

Most contemporary physical activity surveys only assess leisure-time activities that require an energy expenditure above that of daily living. Due to the decline in physical activity levels within occupations in most industrialized countries (Powell, Thompson, Caspersen, & Kendrick, 1987), it is assumed that assessment of leisure-time physical activity may provide the best representation of population-wise variance in physical activity. However, in developing countries and lower economic groups, occupational activity appears to offer a significant contribution to total energy expenditure, particularly in men (Pereira et al., 1998; Mayer et al., 1991).

Transportation:

In addition to occupation, transportation activities such as biking or walking may be an important contributor to total energy expenditure in some of our ethnic/racial groups. Specifically walking is often found to be one of the most popular activities cited (Kriska et al., 1990; Rohm-Young, 1999).

Household and Care Taking:

For women in general, housework and family care taking appears to take a substantial portion of the total energy expenditure of an average day. This finding appears to be even more significant in minority and/or lower economic women (Hatch et al., 1999, Tortolero, Masse, Fulton, & Torres, 1999; Sternfeld, Ainsworth, & Quesenberry, 1999).

Sports and Leisure:

Focus groups involving African-American and Hispanic women have found that high intensity sports are typically not a frequently reported activity for these women (Hatch et al., 1999, Tortolero et al., 1999; Eyer et al., 1998). Caucasian women are more likely to appear in the highest quartile of sports/exercise ranking than their minority (African-American, Hispanic, Asian) counterparts (Sternfeld et al., 1999). More common sports and leisure activities reported in minority women are typically lower intensity activities such as walking and dancing (Eyer et al., 1998).

In summary, the types of physical activities that encompass the greatest proportion of energy expenditure in our minority subgroups, include household physical activities, care taking, walking, and occupation activities. As mentioned earlier, it is likely that differences in activity types between various groups may have more to do with economic resources and access to activities than with cultural differences (Tortolero et al., 1999).

Assessment of sports and leisure activities alone would most likely miss a significant portion of the activities that comprise the total energy expenditure of certain subgroups, potentially resulting in an erroneous picture of the activity levels of that group. A possible example of this is a physical activity phone survey performed in two communities in South Carolina. Based on the results of the physical activity phone survey in which leisure physical activity alone was assessed, high-density lipoprotein cholesterol (HDL) levels were found to be positively associated with activity in white men and women (as expected) but negatively associated with activity in African-American individuals (Macer et al., 1993). It is likely that the relationship between HDL and activity in African-American men and women would be entirely different if other components of physical activity were assessed such as occupational activity or transportation.

Beyond the types of physical activities that need to be assessed, are there other ethnic/cultural issues that should be considered when attempting to measure activity levels in our minority subgroups? Warnecke et al. (1997) have provided an interesting summary of some of the mental tasks that respondents perform when answering a survey questionnaire and how race and ethnicity may influence these tasks (Warnecke et al., 1997):

According to Warnecke (1997), the four basic tasks that an individual performs when answering a survey question are interpretation, memory retrieval, judgment formation, and response editing.

Interpretation

In their article, Warnecke et al. (1997) warn that variation in how a question is understood among respondents or between the respondent and the interpreter can result in data that is vulnerable to misinterpretation. Focus group interviews have confirmed that the interpretation of broad-based words such as "leisure" or "physical activity" or "exercise" have the potential for huge variability (Aihiehenuwa, Kumanyika, Agurs, & Lowe, 1995; Tortolero et al., 1999; Eyer et al., 1998). As an example, a 32 year old clerical worker who served as a member of one of Mayo's (1992) focus groups defined exercise as "anything that you have to do that you don't normally (do)."

Therefore, the activity questionnaires need to be very specific to the ethnic/cultural group in question, with wording that is clear and unambiguous. 'Leisure-time' may mean various things to different people and has been equated with inactivity, laziness, or considered a luxury that many women do not have (Tortolero et al., 1999). It is best to use questions about specific activities rather than opened-ended broad-based questions that may be prone to "interpretation biases" and require that the individual makes a decision about what counts as "physical activity".
Memory Retrieval

There did not appear to be any effect of culture on the recall strategy used. The issue that was shown to be related to recall strategy was the reported frequency with which an event was performed (Warnecke et al., 1997).

Judgement Formation

If the task requires judgement in processing the information that is being retrieved from memory, it is possible that this task may be affected by racial or cultural background (Warnecke et al., 1999). As an example, culture may influence the use of extreme responses in reporting judgements on rating scales. Using a health locus-of-control scale, Warnecke et al. found that minority respondents were more likely than the non-Hispanic white respondents to choose extreme response categories. Whether this same issue is true in activity assessment is not clear but appears possible. In her focus groups, Tortolero et al. (1999) noted the varying perceptions of intensity levels of various physical activities in her minority focus group members. Many participants equated intensity levels with stress levels or their level of enjoyment surrounding the activity (Tortolero et al., 1999).

Response Editing

If the respondents are concerned about the social acceptability of their judgements, response editing may also occur (Warnecke et al., 1999). Since being active is quickly becoming a socially desirable trait, it is highly possible that reporting of physical activity levels will be overestimated. Whether or not this social desirability to overestimated physical activity levels varies by racial/ethnic groups is unknown.

The Modifiable Activity Questionnaire:

An example of a questionnaire that has incorporated many of the suggestions described above and, therefore, has been relatively successful in measuring physical activity levels in a variety of minority populations is the Modifiable Activity Questionnaire, or the MAQ (Kriska, 1997). The MAQ includes both a leisure and an occupational activity section since the homogeneity of energy expenditure related to both of these components of activity within many study populations can not be assumed (Kriska & Bennett, 1992). In addition, as the name suggests, the Modifiable Activity Questionnaire was designed to be modified, based upon pilot testing, prior to its usage, in order to maximize the feasibility and appropriateness of the physical activity instrument to the population of interest (Kriska & Bennett, 1992). The MAQ has been shown to be both reliable and valid (through comparisons with activity monitors, fitness (field) testing, and the doubly labeled water technique) in adults and adolescents alike (Aaron et al., 1995; Kriska et al., 1990; Schultz, Harper, Smith, Kriska, & Ravussin, 1994).

Through pilot testing, a list of leisure activities common to that population are compiled. In addition, the lists of types of occupational activities in each job column are to be modified to include typical job activities for the focus population. After a final pilot testing, to assure that the questionnaire is both comprehensive and clearly understood by the participant, the questionnaire is ready for administration. The activity questionnaire does not contain broad-based questions about overall leisure activity participation, but instead, requests that the participant identify all appropriate leisure activities from a comprehensive list. Estimates of frequency and duration are then obtained for each identified activity. In addition, the activity questionnaire does not ask the respondent to estimate the intensity of each activity performed, but instead uses the midpoint of the range of intensities provided for each activity in existing energy requirement lists.

It is also recommended that the questionnaire is interviewer-administered by trained interviewers of the same racial/ethnic group, rather than self-administered. Assuming that the interviewer is properly trained, this process is assumed to result in relatively less errors and fewer missing data. This is in contrast to a recent mail self-administered survey of 2.6 thousand ethnically diverse women from a large health maintenance organization in which over 25% of the respondents made at least one error (Sternfeld et al., 1999).

Summary:

Although the physical activity questionnaire, in general, is the most common measure of physical activity levels in minority subgroups, additional measures may be needed to supplement the information collected by questionnaire alone. The most frequent types of physical activities performed in many of these minority groups are often lower intensity activities. However, when assessing activity by questionnaire, we know that lower intensity activities like walking and housework tend to be less reproducible than higher intensity activities such as many of the organized sports (Kriska et al., 1990; Sallis et al., 1985).

Therefore, the activity questionnaire alone may not be the best way to quantify these lower intensity, variable frequency, life-style activities. As Figure 3 reminds us, measurement of lower intensity activities may require the use of more objective measures. One feasible approach
may be to use a simple, inexpensive, objective measure of activity like an activity monitor or a pedometer. Step monitors are now successfully being used to estimate levels of movement expressed as “daily steps taken throughout the day” and to document activity changes in intervention efforts. However, activity monitors also have their own set of limitations such as the inability of capturing cycling, swimming, and upper body movement. Likewise, monitors certainly are not as practical as physical activity questionnaires in assessing activity in population studies. It is likely that a combination of the two methods of activity assessment would work best. Individuals who have scored low on the activity questionnaire could be given a step monitor to further evaluate their physical activity levels. Although promising, much more work needs to be done in this area.

REFERENCES


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