

QUT Digital Repository:
<http://eprints.qut.edu.au/>



Collins, Brianna and Marshall, Alison L. and Miller, Yvette (2007) Physical activity in women with young children: How can we assess "anything that's not sitting"? *Women and Health* 45(2):pp. 95-116.

© Copyright 2007 Haworth Press

Physical activity in women with young children: How can we assess "anything that's not sitting"?

ABSTRACT

Current physical activity (PA) questionnaires fail to assess accurately daily activities typically undertaken by women, particularly women with young children (WYC). The aims of this study were to explore perceptions of PA and daily activities, and to identify methods for improving self-report PA questionnaires for WYC. Data were collected from 69 WYC (mean age = 35 ± 5yrs) via seven focus groups. Facilitators asked questions about perceptions of PA and factors related to self-reporting activities. Two independent researchers thematically analysed the focus group transcripts. Most participants perceived differences in the meaning of PA and exercise, but many reported difficulty categorizing discrete activities related to childcare, household and occupational tasks because they were often being performed simultaneously and in short bouts. Recommendations for improving physical activity questionnaires for WYC included: the use of interview-administered questionnaires, clarifying category definitions in questionnaire instructions, assessing sedentary and low-intensity activities, providing multiple, relevant examples of activities for each activity category and assessing activities separately for weekdays and weekend days.

Key words: exercise, measurement, focus group, questionnaire

BACKGROUND

A range of national and international agencies recognize physical inactivity as an important contributor to the overall burden of disease (WHO, 2002). Despite the numerous health benefits associated with physical activity, participation levels in developed countries are declining or remaining at an unfavourably stable level (Armstrong, Bauman & Davies, 2000; U.S. Dept of Health and Human Services, 1996; Joint Health Survey's Unit, 1999). Our understanding of current trends in physical activity participation relies upon having accurate and reliable measures.

The complexities in the measurement of physical activity are well recognized (Caspersen, Powell and Christenson, 1985). The growing need to precisely define the types and intensities of activities that should be assessed has further complicated measurement of physical activity over the past decade. Accumulating evidence now suggests that physical activity performed at a moderate-intensity (energy expenditure of 3-6 metabolic equivalents (METs)) can confer health benefits (Pate et al, 1995). Furthermore, the volume of physical activity necessary for health benefit does not need to be performed in a single bout and can be performed as part of daily routines (e.g., as active transport or physically demanding occupational tasks) (Pate et al, 1995). The most widely adopted contemporary physical activity recommendation suggests that adults should accumulate at least 30min of moderate-intensity physical activity on most days of the week to achieve or maintain good health (Pate et al, 1995, Commonwealth Department of Health and Ageing, 1999). This recommendation is known as the guideline for 'health-enhancing physical activity' (HEPA).

Recent studies have found that some household and childcare activities may be classified as moderate-intensity. Moderate-intensity activities in these categories include various gardening tasks (Hendelman, Miller, Baggett, Debold & Freedson, 2000), window washing, vacuuming, pushing strollers (Brown, Ringuet, Trost, & Jenkins, 2001), sweeping and mopping and playing with children (Bassett, Ainsworth, Swartz, Strath, O'Brien, et al, 2000). Therefore, these household and childcare activities should be included in a measure to assess overall HEPA.

Researchers currently use many self-report questionnaires to assess HEPA, although most questionnaires only assess leisure-time physical activity (for review see Sallis & Saelens, 2000). Questionnaires that do assess other forms of activity commonly do not include data related to household and childcare activities in estimating total HEPA (Phongsavan, Merom, Marshall & Bauman, 2004), and resulting estimates are therefore unlikely to represent the full range of moderate-intensity activities that should be considered.

The exclusion of household and childcare activities from physical activity measures has particular relevance for women (Ainsworth, 2000). Observational studies of women's time use have shown that women spend significant portions of their day in occupational, household and child-care activities, and less time in recreational and conditioning activities (Ainsworth, Irwin, Addy, Whitt & Stolarczyk, 1999; Schor, 1992; Shaw, 1991). Data from the Women's Health Australia Project indicate that women with young children (aged 0-5yrs, WYC) are significantly less likely to be physically active than women without children (Brown, Mishra, Lee & Bauman, 2000). However, these apparent differences in physical activity may be due to inaccurate measurement rather than actual inactivity among WYC (Ainsworth, 2000).

Including household and childcare activities in self-report questionnaires is one recent strategy to address the problem of inaccurate physical activity measurement among women (Ainsworth, 2000). Previous studies have modified leisure-time physical activity questionnaires to include questions about household, childcare and occupational tasks (Randsell & Wells, 1998; Wilbur, Naftzger-Kang, Miller, Chandler & Montgomery, 1999; Sternfeld, Ainsworth, & Quesenberry, 1999). Only one of these modified questionnaires has been validated and used in subsequent studies (Ainsworth, Sternfeld, Richardson & Kirby, 2000). However the usefulness of the data from this questionnaire is limited because it does not collect specific data on frequency, duration or intensity of the activities being assessed, This limits the ability of the questionnaire to adequately differentiate between different 'doses' of physical activity.

Other questionnaires were developed specifically to capture the activities of African American women (Ainsworth, Lamonte & Drowatzky, 2000) and pregnant women (Chasan-Taber, Schmidt, Roberts, Hosmer, Markenson & Freedson, 2004). However, the specificity of these questionnaires also limits their application and validity in other populations of women, such as WYC. Thus, there is a need to develop ways to accurately measure WYC's physical activity patterns, for epidemiological research and to monitor changes in physical activity levels resulting from interventions. The aim of this study was to explore qualitatively WYC's perceptions of physical activity, how they categorize daily activities and to identify methods for improving the accuracy of self-report physical activity questionnaires for WYC.

METHODS

Participant Recruitment

Advertisements in the newsletter of the Playgroup Association of Queensland invited women with young children (aged 0-5 years) to participate in focus group discussions. A \$20 donation per study participant was offered to each Playgroup. Women from 14 Playgroups expressed interest in participating. To be eligible to participate, women had to have at least one child aged less than 5 years and be able to speak and read English. Recruitment continued until no new information was collected from each new group, which is consistent with approved methods for conducting qualitative research (Stewart & Shamdasani, 1990). All study participants provided signed written informed consent before being involved in the focus groups. The University Human Research Ethics Committee approved the study.

Procedures

The typical meeting venue of each Playgroup and the same moderator were used for each focus group. Refreshments were provided, and a childcare professional was employed to supervise the participants' children during the discussion.

Before the discussion group began, the women who gave consent to participate and to have the discussion tape recorded were asked to complete a short socio-demographic questionnaire and the Typical Week Physical Activity Survey (TWPAS) (Ainsworth, Lamonte & Drowatzky, 2000) (see Appendix A). This questionnaire has been shown to have acceptable criterion validity ($r = 0.51$) and test retest reliability ($r = 0.55$ to 0.75) among African American women (Ainsworth, et al, 2000). To stimulate discussion

among the participants, the TWPAS was used as an example of a self-report physical activity questionnaire. The TWPAS was selected because it assesses a wide range of activities not typically included in other self-report measures of physical activity and provided an example for the participants of a comprehensive measure of physical activity. The TWPAS assesses the number of days and average amount of time per day for weekdays and weekend days for a wide range of activities.

The discussion began with general questions about perceptions of physical activity, included an activity examining the categorization of specific activities, and ended with questions relating to the measurement of physical activity by self-report questionnaires. Table 1 shows all the focus group questions asked under each of the relevant research questions.

Insert Table 1 here

Participants completed a brainstorming activity, in which they were asked to write on post-it notes all the activities that they perform in a typical day. Participants were then presented with a poster divided into activity categories (based on TWPAS categories-see Appendix A) and asked to place each post-it note on the poster in the category they felt best defined the activity and where they would report it in a questionnaire. Any inconsistencies in activity classifications between participants were identified and discussed, to explore how the participants conceptualized the activity categories.

Data Analysis

Each focus group discussion was transcribed verbatim, and two researchers thematically analyzed the transcripts independently. The thematic analysis followed a systematic and iterative process, the “cut and paste technique”, whereby major themes

and categories were identified and used to classify data from each group, then across the complete dataset (Stewart & Shamdasani, 1990).

Each analyst classified the data according to the three main research questions: 1) perceptions of physical activity, 2) categorizing physical activity, and 3) how to improve the quality of information reported in self-report questionnaires. The independent analysts compared the separate analyses and discussed any discrepancies with a third researcher until consensus was reached. To identify any inconsistencies in the way women categorized their activity, data from the brainstorming activity were analyzed in terms of the frequency with which specific activities were reported in each TWPAS category,.

Although it is beyond the scope of this paper to provide full descriptive data from participant's responses to the TWPAS, summary data is reported where directly related to qualitative findings. TWPAS and socio-demographic data were analyzed using SPSS v11. Estimated total weekly time spent in each physical activity category was calculated, along with an estimate of time (mins/wk) spent in HEPA, both including and excluding household and childcare related activities. As is common for most self-report physical activity data (Brown, Bauman, Chey, Trost, & Mummery, 2004), the TWPAS data were skewed, therefore the median and the 25th to 75th percentile range are reported.

RESULTS

Participant Characteristics

Data were collected from 69 WYC (mean age = 35±5yrs) via seven focus groups. Groups ranged in size from six to 13 participants and lasted between one and 1.5 hours.

The majority of participants' body mass index (kg/h^2) was in the healthy weight range (18.5 - 25, National Health & Medical Research Council, 2003). Most were married (94%) and had more than one child living at home (76%). Less than half had attended university (47%) and more than half reported their occupation as 'full-time home duties' (56%).

Focus Group Findings

The focus group transcripts were analysed under the three main research questions. The themes that emerged within each research question and illustrative quotes are shown in Table 1. Each theme is discussed in more detail in the text below.

Participants' Perceptions of Physical Activity

When asked what the term physical activity meant to them, most groups discussed differences in the meaning of the terms 'physical activity' and 'exercise'. Most distinguished physical activity from exercise in terms of organization and structure.

Physical activity was often described in terms of everyday activities. For example, one participant said it was *"anything, just a normal day"* and another said *"it's kind of anything that's not sitting for me, like walking, running, just general activities."*

Participants perceived exercise to be more structured and time consuming. Comments about exercise included *"making a point to be physically active"*, and *"it's much more structured. You have to set aside time to exercise"*. A typical comment about exercise was that it was *"too much hard work"*.

Categorizing Physical Activity

Most of the activities identified in the brainstorming activity (n=763) were categorized by participants as either 'household' or 'childcare' activities (67%). Only 10% of the activities

identified were categorized as 'leisure', 6% as 'transport', 4% as 'occupational' and 'walking', and only 3% as 'lawn/garden' activities. Table 2 shows the activities that were allocated to multiple categories and the category distribution of these activities.

Insert Table 2 here

Most participants categorized the specific activity 'playing with children' in the 'childcare' category (n=38) although some women (n=5) categorised it as 'occupational'. When this was explored further one participant said she had categorised it as 'occupational' because "*that's what I do; I'm a full time mum*".

Analysts identified that some activities included in the brainstorming activity were not included as examples in the TWPAS. These activities included attending Playgroup, breastfeeding and Pilates/ yoga. There were also other activities that were used as example activities in the TWPAS that were not identified in the brainstorming activity, such as; ride the subway, shoveling, chopping wood, dancing in church, raking, racquetball and ranch labor.

Physical Activity Measurement Issues

Focus group data concerning the measurement of physical activity and the use of self-report questionnaires were broadly classified into three themes: 1. Multi-tasking and duplicate reporting, 2. Recall factors, and 3. Suggestions for administration.

Multi-tasking and duplicate reporting: A major issue, which dominated discussion in all groups, was the difficulty participants experienced in trying to estimate accurately the frequency and duration of their activities. Participants discussed doing multiple tasks in short bouts, and doing different activities simultaneously, for most of the day. Women reported that this feature of their daily activities made it difficult to separate activities into

discrete categories or blocks of time. This was demonstrated by comments such as *"We're doing multiple things at one time"* and *"It's really hard to put a time on it, 'cause you start something and you don't necessarily finish it you come back to it later so you never actually know how long things take."*

The participants reported difficulty in categorizing their activities within the TWPAS. This was highlighted in their interpretation of the instructions and categories used in the survey. Some activities, particularly those related to childcare and household tasks, were reported in different categories by different participants and in multiple categories by the same participant.

Participants also reported multiple activities for the same period of time. As one participant illustrated, *"they don't all have to add up do they? Cause mine's going to be like a 35 hour day"*. This problem was highlighted in the analysis of the TWPAS data. The median (25th-75th percentile) HEPA (including all activities classified as \geq moderate-intensity) reported by participants in the TWPAS was 1365 (645-2884) mins/wk. Based on these data, over 95% of the participants would have been classified as meeting the HEPA guideline. When only those data from the leisure-based moderate-intensity physical activities were included, the median dropped to 300 (143-608) mins/wk, but still over 75% of participants would have met the HEPA guideline.

Recall factors: Participants felt that examples of different types of physical activity were very important in helping them to recall and categorize their activity. One participant said that *"without the examples it would have been impossible to fill out"*.

The examples were considered very important for helping the participants to understand the different physical activity intensity classifications (e.g., light, moderate- or vigorous-

intensity activity). One participant commented that the *"examples of what each of them meant, made it easier to know what you meant by each intensity"*. Some of the examples used in the TWPAS, 'chopping wood' and 'dancing in church', were identified by most of the participants as irrelevant to them.

Most participants felt that they had to really concentrate on the instructions. Some participants misinterpreted the reference period and units of measurement, reporting 'hours/week' or 'hours/month' rather than 'hours/day'. This may have been because the overall instruction was to recall activities performed in a 'typical week in the last month', so reference periods were inconsistent.

The majority of participants felt that the typical week recall period was easier to remember than a specific week and more accurate. One participant said *"the things I do I repeat, you know I do over and over again, and I have a bit of a routine"*, while another participant said *"every week is different you know, so I might not fill it out real accurate in one week cause I was sick or the kids were sick"*.

The majority of participants felt it was important to assess week days separate from weekend days. One participant explained that they *"engage in different types of activities on the weekends and week days"* and another said *"I do less housework on the weekend and more leisure."*

Some groups suggested that only time spent sitting and sleeping (or lack of it) should be assessed. Comments included, *"it would be easier actually to ask me how many hours I spend sitting down.....I can remember specifically the times that I was sitting still because they were precious to me"* and *"how 'bout if I just write down the sleeping time?"*.

Suggestions for administration: All groups felt the instructions should say to *“read the whole questionnaire and then fill it out.”* Another common suggestion across groups was to categorise activities by intensity. One participant explained that a questionnaire could have *“all the light activities like reading, cooking or whatever under one heading so you could do it that way. Then have like your vacuuming and heavier stuff under other headings”*. Several participants also suggested it would be better to have a diary format or *“some kind of ticking system, instead of trying to estimate whether it’s one or two hours a day”*.

All groups reported that they would be reluctant to respond to telephone questionnaires. Comments included, *“if you ring me on my phone, I say I’m not interested and I hang up”* and *“the kids always have a scrap when I’m on the phone; the phone for me is the worst way to talk to me”*. They also reported that they would be more likely to respond to a self-completed questionnaire sent to them either in the post or via email *“cause then it’s in your time”*, and they would prefer to be given *“a pre-paid envelope to get it back to you”*.

The participants were also supportive of face-to-face administration, but only if it was pre-arranged. As one participant indicated she would be willing to complete a face-to-face survey if administrators *“let us know when and where. If mothers know something is going to happen then we can plan for it”*. Another participant said *“if there is incentive, like giving the playgroup money, I’d find the time to do it for you ”*.

DISCUSSION

This study aimed to explore perceptions of physical activity, categorization of daily activities and to identify specific measurement issues for WYC. Participants in this study revealed a good understanding of what physical activity is and how it differs from exercise. However, the main findings also suggest some challenges in assessing physical activity accurately in WYC.

Clarifying perceptions of physical activity among WYC is an essential part of understanding the measurement issues underlying physical activity questionnaires (Tudor-Locke, Henderson, Wilcox, Cooper, Durstine & Ainsworth, 2003). The majority of the WYC in this study felt that the term “physical activity” referred to less-structured, activities of daily living when compared to the term “exercise”, which was perceived to be structured, strenuous activity. A previous study that investigated the meaning of these terms among African American women aged over 40 years (Tudor-Locke et al, 2003) supports our findings. Previous research has highlighted the importance of gender-specific wording of physical activity questionnaires that is sensitive to women’s daily responsibilities and care-giving roles (Ainsworth, 2000; Tudor-Locke et al, 2003).

The childcare and household activity categories accounted for over two-thirds of the activities that the women recalled during the brainstorming activity. Childcare and household tasks were classified as occupational activities by some participants, because they perceived their care-giving role as being a full time job. This finding has two implications for assessing physical activity in this population group. First, given that some of these activities can be of sufficient intensity to confer health benefits, these activities should be included in physical activity questionnaires (Hendelman et al., 2000;

Bassett et al., 2000; Brown et al., 2001). Second, careful thought must be given to adequately describe in questionnaire instructions how these activities should be classified, so that respondents have a clear understanding of where and when to report their relevant childcare and household related activities.

Participants in this study reported difficulty in separating their daily activities into discrete tasks and categories. This inadvertently led to some activities being reported in duplicate across several categories (e.g. as child care or domestic tasks and also as occupational activities). Participants also expressed difficulty in accurately estimating the frequency and duration of their less structured, multi-focused daily activities. This issue was amplified by participants' tendency to report two activities in the same time frame as they tried to account for doing multiple tasks simultaneously.

The difficulties in reporting and categorizing the types, frequency and durations of discrete activities may have led participants to over-report their activity in the TWPAS. Data from the TWPAS suggested that over 95% of the participants in this study were doing enough physical activity to meet the HEPA guideline. In fact, the median total physical activity estimate calculated from the TWPAS data was over four times the current HEPA recommendation (150 minutes/week; CDHA, 1999; Pate et al., 1995). It is possible that the higher physical activity estimates from the TWPAS in this study reflect the attempt to assess a wider range of activities than those typically assessed by other population measures. However, it is highly unlikely that almost all the women in this study were meeting the physical activity recommendations. A more plausible explanation supported by previous literature and our focus group data is that activity levels were being over-reported (Walsh, Hunter, Sirikul & Gower, 2004; Timperio, Salmon & Crawford, 2003; Leenders, Sherman & Najaraja, 2000).

The difficulty the participants in this study experienced in categorizing and quantifying their daily activities may have been related to the misinterpretation of recall period, formatting of the activity categories, and clarity of questionnaire instructions. To avoid over-reporting of activities it is recommended that future questionnaires provide clear concise descriptions of each activity category, allow for reporting of childcare and household type activities as well as lower-intensity activities, provide multiple examples of activities in each intensity category and separate recall of weekend and weekday activities.

Our findings suggest that participants found it difficult to understand the instructions and categories used in the example questionnaire (TWPAS) and that this contributed to over-reporting. Participants misunderstood the written instructions provided, thus they tended to report frequency values (days per weekend or week) that were greater than the maximum possible. One way of increasing the accuracy of the instructions and thus the data provided in self-report questionnaires would be to interview-administer the measures. This method of administration would allow for further clarification of reporting instructions, and reduce over-reporting, although participants discussed the convenience of the interview time and location as a concern.

Data from the focus group discussions also revealed that women wanted the opportunity to report time spent sitting or in sedentary behaviour. The participants in this study felt that reporting the amount of time spent sitting or resting would demonstrate the large amount of time they spent in physical activity. This finding resonates with previous research that suggests WYC perceive their roles and daily activities to be undervalued (Lewis & Ridge, 2005; Miller & Brown, 2005). Therefore, WYC may over-report the amount of physical activity they perform, especially in terms of the duration of household

and childcare activities, as one way of challenging social perceptions about time use among women in care giving roles. Additionally, by providing an opportunity for women to report sedentary activity, it reduces the chance of them including these activities in other categories. This is crucial from a researcher's perspective as it increases the accuracy of the respondents reporting of moderate-intensity physical activity, which is commonly the variable of interest. For these reasons, it is important that future questionnaires assess sedentary behaviour.

The participants felt that the activity examples were extremely important in assisting them to classify their activity accurately. A wide variety of examples including activities specifically engaged in by women should be included. Further, the specific examples given should consider the activities unique to certain cultural and geographical locations (i.e. TWPAS included 'chopping wood', 'riding the subway', or 'ranch labor', not culturally relevant to Australian WYC). The use of several appropriate examples should increase the likelihood that similar activities are reported in the appropriate category. A limitation of this study is that it is not clear whether the participants considered the examples provided in the questionnaire to be select examples or a comprehensive list of activities. This should be explored in future research to assess to ensure that respondents do not just recall time spent in the example activities.

Results from the brainstorming activity show that there were inconsistencies between the activities identified by the participants and those provided as examples in the TWPAS. It is recommended that the activities identified in the brainstorming activity be used as example activities in future development of questionnaires for Australian WYC. Furthermore, these examples should be used in the categories that they were most commonly allocated to (i.e. meal preparation was 70% Household category (Table 2)).

Participants in this study preferred to report their activity separately for weekdays and weekend days. The women felt that the types, duration and frequency of their activities were different on weekdays compared to weekend days and therefore would be easier to recall them separately. This recommendation is particularly important for future development of questionnaires for WYC considering the difficulty they experience in categorizing discrete activities and estimating duration of activities.

Interpretation of the findings of this study should consider its strengths and limitations. Although a relatively large sample was included in this study, it cannot be considered representative of all WYC. Recruitment from pre-existing Playgroups means that the women in each group may be more like each other than WYC who do not attend Playgroups. Nevertheless, the demographic spread demonstrated considerable within-sample variability.

As is the case with all focus group research, the data in this study may have been influenced by social desirability bias and by one or two members of each group dominating the discussion (Stewart & Shamdasani, 1990). This potential bias was minimized in the present study by using strategies to involve everyone in the discussion and recruiting existing groups of women who were acquainted prior to their participation. Further, the discussion topic was not particularly sensitive.

While this study was specifically designed to explore the perceptions of WYC, some of the findings have wider application. Findings from this study that are relevant to physical activity assessment in general include the importance of clear concise questionnaire instructions, clarifying category definitions in questionnaire instructions, use of multiple relevant examples of activities, assessing sitting and low-intensity activities and

assessing activities separately for weekdays and weekend days. The findings of this study that are specifically relevant to the development of future questionnaires for WYC include avoiding telephone administration and assessing childcare and household activities.

A consideration for future research is the importance of designing questionnaires that assess different activity categories separately. This will allow for more accurate quantitative assessment of HEPA and how different activity categories and doses relate to health benefits. This is particularly important given the evidence from qualitative research in this study and previous studies, which highlight that WYC perceive the health benefits associated with different types of physical activity to be different (Lewis & Ridge, 2005; LoCascio, Thomas, Connolly, Finney Lamb & Sainsbury, 1999). WYC believe that there is greater health benefit from physical activities not performed as part of their care giving role, particularly in relation to health outcomes such as improved mental health, stress relief and coping with the demands of motherhood (Lewis & Ridge, 2005; LoCascio et al, 1999). This future research will inform the development of questionnaires that increase the quality of physical activity assessment in epidemiological research and sensitivity to change in intervention assessment.

Overall, the findings of this study suggest that WYC have accurate perceptions of physical activity, but found it difficult to categorize and report the types, frequencies and durations of their daily activities. Collective adoption of the recommendations made in this paper in the development or modification of self-report physical activity questionnaires for WYC should encourage more accurate quantification of their overall activity patterns. However, future research on the measurement properties (reliability and validity) of any revised questionnaire should be conducted before it is widely used.

Acknowledgements

The authors thank the Playgroup Association of Queensland for their cooperation and the volunteers that participated in the focus groups. The study was funded by a New Staff Start-Up Grant to the last author.

References

- Ainsworth, B.E. (2000). Issues in the assessment of physical activity in women. *Research Quarterly for Exercise and Sport, 71*(2), 37-42.
- Ainsworth, B.E., Irwin, M.L., Addy, C.L., Whitt, M.C., & Stolarczyk, L.M. (1999). Moderate physical activity patterns of minority women: the Cross-Cultural Activity Participation Study. *Journal of Women's Health, 8*, 805-813.
- Ainsworth, B.E., Lamonte, M.J., & Drowatzky, et al. (2000). Evaluation of the CAPS Typical Week Physical Activity Survey among minority women. In proceedings of the *Community Prevention Research in Women's Health Conference*, Bethesda, MD: National Institutes of Health, p.17.
- Ainsworth, B.E., Sternfeld, B., Richardson, M.T., & Kirby, J. (2000). Evaluation of the Kaiser physical activity survey in women. *Medicine and Science in Sports and Exercise, 32*(7), 1327-1338.
- Armstrong, T., Bauman, A., & Davies, J. (2000). *Physical Activity Patterns of Australian Adults. Results of the 1999 National Physical Activity Survey*. Canberra: Australian Institute of Health and Welfare.

- Bassett, D.R., Ainsworth, B.E., Swartz, A., Strath, S. J., O'Brien, W., & King, G.A. (2000). Validity of four motion sensors in measuring moderate-intensity physical activity. *Medicine & Science in Sports Exercise*, 32(9), s471-s480.
- Brown, W., Bauman, A., Chey, T., Trost, S., & Mummery, K. (2004). Comparison of surveys used to measure physical activity. *Australian and New Zealand Journal of Public Health*, 28, 128-134.
- Brown, W., Mishra, G., Lee, C., & Bauman, A. (2000). Leisure time physical activity in Australian women: Relationship with well-being and symptoms. *Research Quarterly for Exercise and Sport*, 71(3), 206-216.
- Brown, W., Ringuet, C., Trost, S., & Jenkins, D. (2001). Measurement of energy expenditure of daily tasks among mothers with young children. *Journal of Science & Medicine in Sport*, 4(4), 379-385.
- Caspersen, C.J., Powell, K.E., & Christenson, G.M. (1985). Physical activity, exercise and physical fitness: definitions and distinctions for health related research. *United States Public Health Reports*, 100, 126-131.
- Chasan-Taber, L., Schmidt, M.D., Roberts, D.E., Hosmer, D., Markenson, G., & Freedson, P.S. (2004). Development and validation of a pregnancy physical activity questionnaire. *Medicine and Science in Sport and Exercise*, 36 (10), 1750-1760.
- Commonwealth Department of Health and Ageing. (1999). *National Physical Activity Guidelines for Australians*. Canberra. Commonwealth Department of Health and Ageing.

Hendelman, D., Miller, K., Baggett, C., Debold, E., & Freedson, P. (2000). Validity of accelerometry for the assessment of moderate intensity physical activity in the field. *Medicine and Science in Sports and Exercise*, 32(9), s442-s449.

Joint Health Survey's Unit. (1999). *Health Survey for England: Cardiovascular Disease 1998*. London: The Stationery Office.

Leenders, N.Y., Sherman, W.M., & Nagaraja, H.N. (2000). Comparison of four methods of estimating physical activity in women. *Medicine and Science in Sport and Exercise*, 32 (7), 1320-1326.

Lewis, B., & Ridge, D. (2005). Mothers reframing physical activity: family oriented politicisation, transgression and contested expertise in Australia. *Social Science & Medicine*, 60, 2295-2306.

LoCascio, M., Thomas, M., Conolly, A., Finney Lamb, C., & Sainsbury, P. (1999). *Busy mums wanted: a qualitative study of mothers and physical activity*. Sydney: Social Health Research Unit, New South Wales Health and Central Sydney Area Health Service.

Miller, Y.D., & Brown, W.J. (2005). Determinants of active leisure for women with young children- an "ethic of care" prevails. *Leisure Sciences*, 27, 405-420.

National Health and Medical Research Council. (2003). *Clinical Practice Guidelines for the Management of Overweight and Obesity in Adults*. Commonwealth of Australia: Canberra.

Pate, R.R., Pratt, M., Blair, S.N., Haskell, W.L., Macera, C.A., et al. (1995). Physical activity and public health: a recommendation from the Centres for Disease

- Control and Prevention and the American College of Sports Medicine. *Journal of American Medical Association*, 273 (5), 402-407.
- Phongsavan, P., Merom, D., Marshall, A.L., & Bauman, A. (2002). Estimating physical activity level: the role of domestic activities. *Journal of Epidemiology and Community Health*, 58, 466-467.
- Randsell, L.B., & Wells, C.L. (1998). Physical activity in urban white, African American, and Mexican American women. *Medicine and Science in Sports and Exercise*, 30, 1608-1615.
- Sallis, J.F., & Saelens, B.E. (2000). Assessment of physical activity by self-report: status, limitations, and future directions. *Research Quarterly for Exercise and Sport*, 71(2), 1-14.
- Schor, J.B. (1992). *The Overworked American*. New York: Harper Collins.
- Shaw, S.M. (1991). Women's leisure time- Using time budget data to examine current trends and future predictions. *Leisure Studies*, 10, 71-81.
- Sternfeld, B., Ainsworth, B.E., & Quesenberry, C.P. (1999). Physical activity patterns in a diverse population of women. *Preventive Medicine*, 28, 313-323.
- Stewart, D.W., & Shamdasani, P.N. (1990). *Focus Groups; Theory and Practice*. *Applied Social Research Methods Series Volume 20*. London: Sage Publications.
- Timperio, A., Salmon, J., & Crawford, D. (2003). Validity and reliability of a physical activity recall instrument among overweight and non-overweight men and women. *Journal of Science and Medicine in Sport*, 6(4), 477-491.
- Tudor-Locke, C., Henderson, K.A., Wilcox, S., Cooper, R.S., Durstine, J.L., & Ainsworth, B.E. (2003). In their own voice: Definitions and interpretations of physical activity. *Women's Health Issues*, 13, 194-199.

- U. S. Department of Health and Human Services. (1996). *Physical Activity and Health: a Report of the Surgeon General*. Atlanta, Centres for Disease Control and prevention.
- Walsh, M.C., Hunter, G.R., Sirikul, B., & Gower, B.A. (2004). Comparison of self-reported with objectively assessed energy expenditure in black and white women before and after weight loss. *American Journal of Clinical Nutrition*, 79(6), 1013-1020.
- Wilbur, J., Naftzger-Kang, L., Miller, A.M., Chandler, P., & Montgomery, A. (1999). Women's occupations, energy expenditure, and cardiovascular risk factors. *Journal of Women's Health*, 8, 377-387.
- World Health Organisation. (2002). *World Health Report, 2002, Reducing Risk Promoting Healthy Life*. World Health Organisation, Geneva.
<http://www.who.int/whr/2002/en/> (cited online February 2005).

Table 1: Summary of the Research Questions, Focus Group Questions, Major Themes & Example Quotes

Research Question	Focus Group Question	Major Themes	Example Quote
How do WYC perceive physical activity?	What does physical activity mean to you?	Primarily defined by differences from exercise & everyday application.	"It's [physical activity] just all the stuff you do in a normal day. You're always on your feet."
	What are the differences between physical activity, exercise, sport and leisure-time physical activity?	Major differences were structure and organisation of exercise as opposed to general activity.	"Exercise is something you plan to do and it's usually harder to, like more intense."
How do WYC categorize their daily physical activity?	Assessed via brainstorming activity.	Most commonly identified activities were childcare & household tasks. Discrepancies in categorizations e.g. occupational vs childcare.	
What methods would improve self-reported physical activity in WYC?	Were there any activities that you think weren't covered in the survey?	Multi-tasking makes recall of separate activities difficult.	"It's just really hard to think in that way. Like separate activities. You do them all at once when you're a mum."
	How could the clarity of the surveys instructions be improved?	Need to define categories & expected reporting structure clearly.	"I couldn't tell where I was meant to put the different activities. The instructions weren't very clear."
	Were the examples in the survey helpful? Which ones weren't?	Examples very important for recall. Some examples were perceived to be irrelevant.	"I couldn't have done it without the examples." "I don't chop wood or dance in church."
	Is the timeframe used in the survey practical? Is it easy to recall a typical week?	Typical week preferred over last week recall period.	"You have a routine so you know what you do, but maybe last week the kids were sick so it wouldn't be right."
	How willing would you be to complete this survey if I approached you as a researcher?	Administration must be pre-organised, avoid telephone administration.	"If I know you're coming I can make time, but don't just show up or call me." "I would just hang up on you. It's simple."

Table 2: Summary of Brainstorming Activity Results

Activity Category	Activity Reported	% Reported in Activity Category
Household	meal preparation	70% [#]
Childcare	meal preparation	30% [#]
	playing with child	90% [*]
	attending playgroup	65% ⁺
	carrying children	83% [^]
Occupational	playing with child	10% [*]
Transportation	carrying children	17% [^]
Volunteer Work	attending playgroup	30% ⁺
Leisure	attending playgroup	5% ⁺

Appendix A: Typical Week Physical Activity Survey

(Attached as a separate TIFF file)