Psychosocial and physical activity behaviour among Adults with Intellectual Disabilities in Hong Kong

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Abstract

This study was conducted with the following purposes: 1) to assess the concurrent validity and reliability of the BIQ-C, 2) to get information on the background, demographic data and the lifestyle of adults with ID in Hong Kong shelter workshop, and 3) to get information on physical activity behaviour and psychosocial behaviour of adults with ID in Hong Kong shelter workshop, and 4) a trial run to test the feasibility on running a larger scale of study in future. Results showed that BIQ-C was valid and reliable as an outcome measure to be used for ID. The percentage of obesity was serious among adults with ID, especially on women; and adults with ID had more walking step counts in non-working time compared with that at working time, which was considered "low active" (5,000-7,499 step per day) in physical activity level. Besides, both male and female participants had high outcome expectation, barrier to exercise and low self-efficacy.

Keywords: Hong Kong, adults, Intellectual Disability, Physical activity, Psychosocial Behaviour

Introduction

In Hong Kong there is relatively little information on the physical activity patterns of workers with intellectual disability (ID). When compared with the general population, researchers stated that persons with ID generally die at an earlier age than adults in the general population (average age at death: 66.1 years) and the longevity for adults with Down's syndrome is 55.8 years in average (Day, Strauss, Shavelle, & Reynolds, 2005). The working population with ID in Hong Kong usually had sedentary jobs, which may have affected the amount of physical activity (PA) accrued daily. Besides, obesity is more prevalent in adults with ID than in the general population (Hamilton, 2007). According to Locke's study (2004), there were indices to be used to classify pedometer-determined physical activity in healthy adults were: Sedentary (Steps per day <5,000), Low active (Step per day 5,000 – 7,499), Somewhat Active (Step per day 7,500 – 9,999), Active (Step per day 10,000 – 12,500) and Highly Active (Step per day >125,000). For healthy adults, 10,000 steps per day was a reasonable goal (Tudor-Locke & Bassett, 2004). Since walking appears to be a primary activity of people with mental retardation, this study would assess the walking behavior by pedometer in terms of walking steps taken among adults with ID.

Background Information of the Disabled Population in Hong Kong

In 2000, there were 269,500 people with speech difficulty, seeing difficulty, hearing difficulty, bodily movement, mental illness and/or autism in Hong Kong. Within 269,500 of the disabled persons, about 62,000 to 87,000 people (23-32% of special population) were mentally handicapped (Hong Kong Special Administrative Region Government, 2008). In this special population, findings in Hong Kong indicated that the disabled persons often lead a sedentary lifestyle. The disabled persons spent 3.6 hours/week on watching television, 2.2 hours/week in physical activity, 1.9 hours/week on pursuing hobbies and crafts, and 1.8 hours/week on visiting relatives (Fu, 1996). In terms of employment opportunity, the job nature in day training or vocational rehabilitation of intellectual disability worker was usually a sitting job that may reinforce sedentary lifestyle (Social Welfare Department, 2008). With the significant number of disabled workers in Hong Kong, research attention was needed to address their physical activity level. However, this issue had not been explored in adults with ID. In the light of decreased life expectancy and increased obesity and/or overweight, the present study was conducted that aimed to assess the physical activity of adults with ID by pedometer. With a better understanding of the physical activity behaviour among intellectually disabled workers, it was believed that the present study would be helpful in developing physical activity intervention protocols in this special population in Hong Kong.

Baseline Interview Questionnaire (BIQ-C)

In the present study, psychosocial aspects of physical activity were assessed by the baseline interview questionnaire (BIQ-C) (Heller et al., 2006). BIQ was developed for adults with ID in community-based (Heller et al., 2006) with the sub-scales assessing energy fatigue, pain, life satisfaction, health, work and retirement, living arrangement, social support, community integration, choice-making, exercise knowledge, exercise and activity inventory, stage of change, exercise expectation, barrier to exercise, social/environmental support, and self-efficacy. This assessment tool adopted for people with mild to moderate ID with 3-point Likert scale for ease of understanding. The tools may not be appropriate for people with more severe ID.

After a preliminary review on the items, three subscales of self-efficacy, outcome expectation, and perceived barrier were used in this study because the rest of the categories were not relevant to this study. Chinese versions of psychosocial questionnaire instruments were not available; therefore a Chinese version BIQ-C questionnaire was developed following a translate procedure (Hambleton & Kanjee, 1995) and test-retest after translated and back-

translated of self-efficacy, outcome expectation and perceived barrier were .67, .78 and .71, respectively. While the reliability and test-retest correlation of self-efficacy, outcome expectation and perceived barrier reported by Heller et al. (2006) were .91, .91, .73; 0.52 (p<0.01), 0.72 (p<0.01), 0.55 (p<0.01).

Pedometer

Walking appears to be the most common form of physical activity for individuals with ID. Pedometer was regarded as the most appropriate indicator of assessing walking activity of adults with ID (Pitchford, 2010). Many studies indicated that pedometer was user-friendly, unobtrusive and relatively inexpensive device and was particularly practical for use among populations with ID (Beets & Pitetti, 2011; Hilgenkamp, Wijck, & Evenhuis, 2012; Pitchford & Yun, 2010; Pitetti et al., 2009; Temple & Stanish, 2009). Stanish (2004) examined the accuracy and feasibility of pedometers for monitoring walking in 20 adults with mental retardation and recorded the step counts and distance walked for one week. Intra-class correlation coefficients were above .95. A t-test revealed no gender differences in walking activity. Pitetti (2009) demonstrated pedometers had accuracy during walking among youth with ID by eighteen youth (11 girls, 7 boys) of 4-14 years completed six 80-meter self-paced walking trials while wearing a pedometer at five waist locations (Pitetti et al., 2009). Whereas, in the more recent study, Pitchford and Yun (2010) found that pedometer was highly consistent and reliable with interclass correlation coefficients ranged from 0.89 to 0.97 for participants in adults with Down syndrome. Pitchford and Yun study showed that pedometer was not only suitable for youth, but it was also suitable for adults with ID.

Furthermore, Hilgenkamp (2012) found that any 4 days of wearing a pedometer was sufficient to validly measure physical activity in older adults with ID while Temple and Stanish (2009) suggested that 3 days of pedometer wear was sufficient to predict average weekly steps among adults with ID. In the present study, pedometer step counts were recorded for four consecutive days (Monday to Thursday).

Method

Participants

This study involved 40 volunteers with 2 dropped out due to sickness during the field testing period. A total of 38 adults over the age of 18 years old with mild to moderate ID (20 males, 18 females), (Mean age=37.6, SD=10.1) were recruited from three shelter workshops (St. James Settlements, the Spastics Association of Hong Kong, and the Mental Health Association of Hong Kong). Only those adults with ID who returned the signed parental consent form were recruited as participants.

Measures

Modified baseline interview questionnaire (BIQ-C) (Heller et al., 2006) regarding adult's self-efficacy, outcome expectation, perceived barriers to exercise were examined. BIQ-C was face-to-face administered by an interviewer on its subscales of self-efficacy, perceived barriers and outcome expectation on physical activity.

The self-efficacy scale contains 5 items pertaining to the confidence that one had in performing exercise, including being able to use various kinds of exercise equipment and feeling comfortable performing strength and cardiovascular exercises. Outcome expectations scale includes 9 items: looking better, hurting less, controlling weight, making body feel good, feeling happier, feeling less tired, meeting new people, getting in shape, and improving health. Instrument measures on a 3-point Likert scale. And perceived barriers scale includes 9 items about barriers towards exercise participation. The barriers include lack of energy, lack

of interest, lack of time, perception that exercise was boring, would make condition worse, would not improve condition, was too difficult, the subject being too lazy, and the subject having health concerns. It was rated on a 3-point Likert scale from 1 (not a barrier) to 3 (yes, a barrier) for the person with ID and fro self-efficacy and outcome expectation were rated on a continuum from 1 (not at all sure) to 3 (totally sure).

Chinese version of BIQ instrument was not available. A translation procedure (translated and back-translated) was undertaken based on Hambleton and Kanjee's description (Hambleton & Kanjee, 1995). After the translation and back-translate process, content validity of the BIQ-C was evaluated by two language teachers, who had an average of 10 years working experience in special school and major in Chinese. They were invited to check and amend the wordings of the BIQ-C and the verbal rendering of the items in BIQ-C for the face-to-face interviews with the participants. The BIQ-C was pilot tested by the present investigator with 20 participants and was retested after one month's time. The test-retest by intra-class reliability of BIQ-C were .67, .78 and .71, respectively.

In order to avoid participants' reactivity, activity data were collected by a sealed pedometer (SW-700, Yamax). Pedometer was valid and reliable in assessing step counts for adults with mental retardation (Stanish, 2004). Pedometer step counts were recorded on four consecutive week days with participants wearing the sealed pedometer on their right waist during waking hours except shower or swimming. Before data collection, a 30-step test and 3-shake test (Vincent & Sidman, 2003) were performed to assess the pedometer's accuracy and all the pedometers had batteries replaced.

Procedures

The participants completed the BIQ-C with an interviewer (participants would be encouraged to fill in the BIQ-C by themselves and face-to-face interview by the test administrator would be done if necessary) on fifth day morning before started work.

Test administrators collected the pedometer with step counts and activity data being recorded in a log book separately during working hours and non-working hours on each four consecutive week days; and another pedometer was given to each participant a) every morning before participants started work and b) at the end of the work day. Administrators also had to record the participant's wake-up time, bedtime, time they go to work, time they get off work, type of transportation, commuting time, types of activity and duration of time after work before sleep. Height and weight measures for the calculation of BMI and waist circumference were also recorded.

Results

Demographics

Thirty-eight participants completed the study (20 males, 18 females), (mean age=37.68, SD=10.12). They lived in Wan Chai (N=21) and Kwun Tong (N=17) and they usually took school bus or tram to work. The mean wake-up time was 7 am and bedtime was 10 pm, the mean start-work time was 8:10 am and end-work time was 4:00 pm (See Table 1). The mean step count during office hours was 3685 steps, SD=2192 and the mean step count during non-working hour was 4212 steps, SD=3129. 51% of the participants had activities after work; which were usually of light housework with less than 15 minutes of their non-working time. The mean total daily step counts was 7432 (SD=4073) (See Table 2).

Physical Activity Measure

According to the findings, adults with ID had more step counts in non-working time compared with that at working time, which was considered low active in physical activity

level (Steps per day=5,000 - 7,499). The result from BMI showed that most of the participants were obese (BMI >25). The mean BMI was 27.17, SD=8.05 and the mean waist circumference for male was 34.33 inches, SD=5.09 and for female was 36.14 inches, SD=4.49. These indicated that abdominal fat was high in both men and women with ID, which increased health risk (See Table 3). Combining both BMI and waist circumference, findings also showed that both male and female were classified as obese (BMI 25 or above, waist circumference >39" in men or >34" in women), meaning that males had increased risk of diseases and females had high risk of diseases (Inoue et al., 2000). Findings also showed that both male and female participants had more step counts after work (male: 4024.89, SD=2822.90; female: 4421.39 SD=3509.97) compared with the steps at work (See Table 2).

Table 1
Working Hour among Participants (Mean, SD)

Variable	Mean Hours of Working		Mean Hour of non-working	
Working Hour (Daily):	Mean	SD	Mean	SD
Male (n=20)	7.02	1.60	14.82	1.27
Female (n=18)	7.12	1.30	14.83	0.87
Total (N=38)	7.06	1.44	14.82	1.09

Table 2
Walk Step among Participants (Mean, SD)

Variable	Step at Work		Step after Work		Step per Day	
Step Count (Daily):	Mean	SD	Mean	SD	Mean	SD
Male (n=20)	3520.87	2419.56	4024.89	2822.90	7140.60	3870.90
Female (n=18)	3869.25	1962.17	4421.39	3509.97	7756.08	4377.82
Total (N=38)	3685.89	2192.33	4212.70	3129.35	7432.14	4073.95

Table 3
Anthropometric data among Participants (Mean, SD)

Variable	Male (n=20)		Females (n=18)		Total (N=38)	
	Mean	SD	Mean	SD	Mean	SD
Age	35.90	11.70	39.67	7.90	37.68	10.13
Height (m)	1.61	0.07	1.52	0.09	1.57	0.09
Weight (kg)	64.10	15.86	68.82	20.08	66.34	17.89
BMI (kg/m^2)	24.76	5.56	29.84	9.61	27.17	8.06
Waist Circumference (inches)	34.33	5.09	36.14	4.50	35.18	4.84

Psychological Measures

Scores of the items of the BIQ-C ranged from 1-3 with values close to 1 indicating low score in psychosocial self-efficacy, low outcome expectation and low barrier to exercise. Questions on psychosocial self-efficacy (Mean=.87, SD=.61), outcome expectation on physical activity (Mean=2.6, SD=.29), and barrier to exercise (Mean=1.6, SD=.37) (See Table 4).

Table 4
Psychosocial Aspect towards Physical Activity among Participants (Mean, SD)

Variable	Male (n=20)		Females (n=18)		Total (N=38)	
	Mean	SD	Mean	SD	Mean	SD
Self-efficacy	0.90	0.54	0.84	0.70	0.87	0.61
Outcome expectation	2.56	0.31	2.73	0.24	2.64	0.29
Barrier to exercise	1.57	0.29	1.80	0.43	1.67	0.37

Correlation between BIQ-C Variables and Physical Activity

Concurrent validity by Pearson correlation coefficient between BIQ-C and pedometer step counts were found to be statistically significant on self-efficacy with $r=.44$ ($p<0.01$). The Cronbach's alpha reliability has been used to test reliability of BIQ-C, with good internal consistency of .81, .72, .70 on self-efficacy, outcome expectation and barrier to exercise respectively.

Discussion

Contrasted with the general population, adults with ID had a high risk in obesity, which had been demonstrated to be a risk factor affecting health and longevity. Given the paucity of studies on the effectiveness of weight loss intervention among adults with ID in Hong Kong, there was an urgent need to develop an effective and applicable exercise intervention for them.

Results from Frey (2004), research findings showed that adults with ID were significantly less active. Data also revealed that the average duration of moderate-to-hard physical activity accrued per day was 10 minutes less than the level recommended for health (Frey, 2004). Findings from Temple et al. (2006) on physical activity of adults with ID showed that only one third or fewer were sufficiently active to meet the various health promotion guidelines for physical activity and to achieve health benefits. They suggested that it was necessary to find ways to get people with disabilities more involved in physical activity, particularly the intellectually disabled.

In this study, the investigator found that among Hong Kong Chinese ID workers, about 45% of men and 83% women were considered as obese, while 15% of men and 72% women exceeded the healthy standard of waist circumference (men over 40 inches; women over 35 inches) (Hong Kong: Department of Health, 2008). Compared to the general working population, the obesity rate of ID workers was worrisome, especially in females. The percentage of female obesity (83%) in this study was almost six times above female without ID (13.6%), which was 69.4% higher than the female workers without ID (Hong Kong: Department of Health, 2008). However, the percentage of ID male workers' obesity (20%) was lower than that of the male population without ID (32.2%) (Hong Kong: Department of Health, 2008). According to (Robertson et al., 2000), obesity in women and physical inactivity was high, the result in this study was in line with Stancliffe (2011) that the obesity rate for males with ID was lower than for the general population, and women with ID had

higher prevalence of obesity. Hamilton's study (2007) reported that the obesity among women with ID was higher than that in men and also in general population. Stancliffe (2011) also stated that obesity prevalence differed by living arrangement that people living in their own home had the highest prevalence of obesity. In the present result, the obesity rate was higher in female ID can be explained by the different job nature at work between males and females in different Hong Kong shelter workshop, as women ID could not take outside duties, instead they could only take sitting job in shelter workshop.

When contrasting the waist circumference with the general population in 2007 (Tin-choi et al., 2007), severe central obesity (waist circumference >39" in men or >34" in women) in Hong Kong Chinese working population were 26.7% in both men and women; while in this study, severe central obesity rates among the ID subjects were 15% in men and 75% in women. Again, a great difference was found in female obesity rate. Female participants (72%) were 45.3% higher than the general female working population (26.7%). In conclusion, among women, the percentage of obesity was serious especially among the intellectually disabled, while the percentage of obesity among men with ID was not.

In walking activity, the difference in standard deviation (SD) on total mean steps per day (Mean=7,432, SD=4,073.95) can be explained by the locale of the centers and the transportation between workplace and home. Some participants took shuttle bus to work and return home, while some traveled between workplace and home on foot or by public transport. The difference between male and female steps taken in SD can be explained by different job nature at work between male (Mean=3,520.87, SD=2,419.56) and female (Mean=3,869.25, SD=1,962.17) with ID, since most of the female participants had a sitting job, while only some male participants may have occasional outside duties such as car washing. Data showed that mean step count at work between male (Mean=3,520.87, SD=2,419.56) and female (Mean=3,869.25, SD=1,962.17) were slightly different, which might imply that both male and female ID participants were usually engaged in a sitting job that reinforces sedentary lifestyle and thus they had a higher risk of becoming obese.

In psychological outcomes, comparative data for the general population using equivalent measures for the psychological factor was not available; however, the results suggested that both male (Mean=2.56, SD=0.31) and female (Mean=2.73, SD=0.24) participants had relatively high outcome expectancy, but female (Mean=1.80, SD=0.43) perceived higher barrier towards exercise than male (Mean=1.57, SD=0.29) participants. Both male (Mean=0.9, SD=0.54) and female (Mean=0.84, SD=0.70) participants had a low self-efficacy, and female participants were even lower in this part. The results showed similar outcomes from the special population (Cardinal, Kosma, & McCubbin, 2004) on barrier to exercise (Mean=1.67, SD=.37), and a low self-efficacy score (Mean=.87, SD=.61).

Concurrent validity between BIQ-C variables and PA by Pearson correlation coefficient showed a positive correlation of self-efficacy (r=.44, p<0.01) that participants who have high perceptions towards PA would have high PA participation. BIQ-C with self-efficacy, outcome expectation and barrier to exercise have good internal consistency, with a Cronbach alpha coefficient reported of .81, .72, .70 respectively. BIQ-C was valid and reliable as an outcome measure to be used for ID. BIQ scale has been well established for self-efficacy (Heller, 2001), outcome expectation (Heller & Prohaska, 2001) and barrier (Heller, Rimmer, & Rubin, 2001). It was well known and was used in the large scale of health education programme for adults with ID (Heller, Marks, & Sisirak, 2006).

Limitations
    This study had a few limitations. The present investigator could not verify the disability grade among the participants and the data on the disability grade were confidential in most of the centers. The sample represented adults with mild to moderate ID which were based on a

centre supervisor's confirmation, and then subjects were randomly selected to participate. The results were based on mild to moderate grade participants wearing pedometer for four consecutive days, and the data reflected that adults with ID were obese. However, for those who were unable to wear the pedometer by themselves were excluded from this study (severe grade). If they were included, results would differ. Moreover, the results only reflect the number of steps during weekdays. There was no data on weekends.

Conclusion

Useful descriptive information of background, demographic data and the physical activity behaviour in terms of walking steps on adults with ID in Hong Kong shelter workshop were successfully obtained in this study. BIQ-C was valid and reliable questionnaire for adults with ID and participants did understand the contents of BIQ-C. Although the BIQ scale was well established (Heller, Marks, & Sisirak, 2006), data should be interpreted with caution as only self-efficacy showed to be valid in this study. Further study was needed to assess the validity of BIQ-C. The trial run on this study identified the feasibility on running a larger scale in future study of particular setting in Hong Kong's shelter workshop.

The pedometer-recorded step count was used to show the relationship between the BIQ-C and physical activity that self-efficacy correlated positively with mean office hours (M=7.06) (r=0.4, p<0.01); while mean step counts after work had a significant positive correlation with mean step counts per day (r=0.89, p<0.01), concluding that the longer the non-working hours, the higher the step count. Furthermore, the duration of working hours may affect the step count of people with ID and also the self-efficacy to exercise (r=0.44, p<0.01).

Further work on identifying activity level and the physical activity pattern on non-working days (weekend) was needed in order to help planning intervention strategies towards reducing weight problem and risk of health in the lives of adults with ID. Besides, with the high obesity rate found in female ID, future study was needed to collect physical activity on both weekdays and weekends with a focus on female ID participants in Hong Kong Shelter workshop.

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