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Employment among multiple sclerosis patients in Hong Kong

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Abstract

Objective: Employment is important for patients with chronic illness, and to remain employed is a robust support to them. This study aimed to examine the employment rate and to identify factors associated with employment among multiple sclerosis (MS) in Hong Kong.
Methods: A cross-sectional study was performed from 2010 to 2011 at five major public hospitals. Fifty-nine clinical definite MS patients with no evidence of dementia (Mini-Mental State Examination ≥ 22) were recruited. Demographic data and neuropsychological test results including memory, visual perception, psychological well-being, motor, executive domain and processing speed were collected. Principal component analysis and logistic regression with multiple imputation were used in data analyses. *Results:* The employment rate among MS patients was 56%. Patients with better cognitive functions were more likely to be employed (p=0.002). No significant association was found between employment status and age, gender, level of education, types of MS, disease duration, frequency of relapse or use of interferon.
Conclusion: MS patients had high unemployment rate (44%) which was 11.5 times higher than the general population in Hong Kong. MS patients with better cognitive functions had higher employment rates.

INTRODUCTION

Employment is an important issue for patients with chronic illness, especially for multiple sclerosis (MS), because they are relatively young and are able to work if they are free from the disease. MS patients suffer from chronic disability, psychological stress and low self-image.[1] To remain in the job market is a strong positive reassurance for their physical capability, psychological well being and social network.

The prevalence of MS is low in Asia when compared with the prevalence in Western countries.[2] The usual prevalence of MS in Asia is between 5 to 10 per 100,000 individuals[3,4], which is far less than the prevalence in Caucasians of between 50 to 150 per 100,000.[5] Many studies among the Caucasian populations have shown low employment rates in MS patients.[6] The employment of MS patients is unknown in Asia and there is no study on how to empower them for better employment potential.[7]

To our knowledge, this is the first study which determines employment rate among MS patients in Hong Kong. In the study, we determined their cognitive functions using various psychological tools, to identify factors associated with employment status.

METHODS

This cross-sectional study was conducted from 2010 to 2011 within five major public hospitals in Hong Kong: Pamela Youde Nethersole Eastern Hospital, Prince of Wales Hospital, Princess Margaret Hospital, Queen Elizabeth Hospital and United Christian Hospital. Together, these five hospitals provide a treatment area for

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3,500,000 individuals, i.e. 50% of the Hong Kong population.[8] There is no financial or any other barrier to seek treatment in the public hospitals.[4,9] From our experience, the duration from referral to consultation of most MS patients is within 2 month time. This study was approved by the Research Ethics Committees of the participating hospitals, and informed consent was obtained.

All suspected MS patients were assessed by neurologists. Investigations, including magnetic resonance imaging (MRI), lumbar puncture for cerebrospinal fluid (CSF) oligoclonal bands and evoked potential studies, were done. Patients with clinical definite multiple sclerosis (CDMS) were followed up in the Out-Patient Department (OPD). The recruitment and neuropsychological tests were performed at the OPD. Patients, who were not students or housewives, with no evidence of dementia (Mini-Mental State Examination (MMSE)≥ 22) were recruited. After obtaining informed consent, data, including gender, age, education level, disease subtype (relapsing-remitting, primary progress/secondary progressive), symptom duration, relapse frequency, interferon use and Extended Disability Status Scale (EDSS), were collected. The neuropsychological tests administered included the Brief Visuospatial Memory Test Revised (BVMT-R) that assesses visual memory, in particular immediate and delayed recall[10]; the Benton Judgment of Line Orientation Test (BJLOT) measuring visuospatial judgment[11]; the Grooved Pegboard Test (GPT) that can be performed on either the dominant or non-dominant hand to detect cognitive impairment and slow movement[12]; the Hong Kong List Learning Test (immediate and delayed recall) assessing the processes and organizational strategies involved in verbal information learning[13]; the Paced Auditory Serial Addition Test (PASAT; correct responses) measuring the speed of information processing[14]; the Symbol Digit Modalities Test detecting cognitive impairment[15]; the Trail Making Test A that assesses visual attention and task switching[16]; a verbal fluency test (animal and verbs)[17], the Wisconsin Card Sorting Test (preservative errors and conceptual level responses) assessing the executive functions[18]; the Beck Depression Inventory-II(BDI-II) that is a 21-item self-reporting instrument, intended to assess the severity of symptoms of depression as listed in the DSM-IV Manual[19]; and General Life Satisfaction Scale Test.[20]

Statistical analysis

The independent *t* test, Mann-Whitney *U* test, Pearson's chi-square test or Fisher's exact test was used where appropriate to compare the demographic and clinical characteristics of MS patients with different employment status. Multiple imputation by the Markov chain Monte Carlo algorithm was used to impute the missing data after the missing value pattern analysis using Little's Missing Completely at Random Test by expectation-maximization algorithm. Principal component analysis (PCA) was used to extract relevant information from the neuropsychological tests into psychological components. Multivariate logistic regression was used to examine the relationship between the employment status and different psychological elements after controlling for the demographic and clinical characteristics with $p<0.20$ in the univariate analyses. The backward elimination approach with Akaike's information criterion as the model selection criteria, was used to obtain the best-fit model. Statistical significance was set at$p<0.05$. All analyses were performed using SPSS statistical software (version 19.0; SPSS Inc., Chicago, IL, USA).

RESULTS

A total of 72 MS patients with no evidence of dementia (MMSE ≥ 22) were identified. After excluding 13 housewives and/or students, 59 subjects were recruited, in which one was primary progressive (PP) MS, 4 were secondary progressive (SP) MS and 54 were relapsing-remitting (RR) MS. In the 59 MS patients, 25 had a record of interferon (IFN), and 19 out of 25 were on IFN during the study period. During the study period, no patient was on natalizumab or glatiramer acetate. Table 1 shows the demographic, clinical and psychological characteristics of the subjects. Among 59 subjects analysed, 33(56%)were employed (30 full time, 1 part time permanent, 2 part time temporary) and 26 (44%) were unemployed. There were 22 (66%) and 19 (73%) females in the employed and unemployed patient groups, respectively. The average age of thesubjects was 36.9 years, while that of the employed and unemployed patientswas 36.2 years and 37.8 years, respectively.

There was a trend for higher employment rates among those with higher education levels (secondary or below: 30%, post-secondary: 54%, tertiary or above: 79%), though the values were not statistically significant ($p = 0.08$). Employment

Table 1: Comparison of demographic, clinical and psychological characteristics of unemployed and employed multiple sclerosis(MS) patients

	Unemployed (n=26)	Employed (n=33)	p-values [a]	Total (N=59)
	Mean (SD)	Mean (SD)		Mean (SD)
Gender*				
Female	19 (73.1)	22 (66.7)	0.806[b]	41 (69.5)
Male	7 (26.9)	11 (33.3)		18 (30.5)
Age (year)	37.81 (10.93)	36.21 (7.77)	0.891	36.92 (9.24)
Education level*				
Secondary or below	7 (26.9)	3 (9.1)	0.082[c]	10 (16.9)
Post secondary	16 (61.5)	19 (57.6)		35 (59.3)
Tertiary or above	3 (11.5)	11 (33.3)		14 (23.7)
Subtypes of multiple sclerosis*				
Relapsing Remitting	21 (80.8)	33 (100.0)	0.013[c]	54 (91.5)
Primary Progressive/ Secondary Progressive	5 (19.2)	0 (0.0)		5 (8.5)
Duration of symptoms (year)*				
≤ 5	7 (26.9)	14 (42.4)	0.068[b]	21 (35.6)
6 - 10	13 (50.0)	7 (21.2)		20 (33.9)
> 10	6 (23.1)	12 (36.4)		18 (30.5)
Duration of diagnosis (year)*				
≤ 5	12 (46.2)	19 (57.6)	0.209[b]	31 (52.5)
6 - 10	10 (4.0)	6 (18.2)		16 (27.1)
> 10	4 (15.4)	8 (24.2)		12 (20.3)
Frequency of relapses*				
≤ 2	8 (30.8)	16 (48.5)	0.268[b]	24 (40.7)
> 2	18 (69.2)	17 (51.5)		35 (59.3)
Interferon*				
Off	11 (42.3)	23 (69.7)	0.065[b]	34 (57.6)
On	15 (57.7)	10 (30.3)		25 (42.4)
Extended Disability Status Scale Total Score*				
≤ 5.5	17 (65.4)	32 (97.0)	0.003[c]	49 (83.1)
> 5.5	9 (34.6)	1 (3.0)		10 (16.9)
BVMT - total immediate recall - raw score	15.00 (7.15)	21.61 (6.86)	0.001	18.69 (7.68)
BVMT - delayed recall - raw score	5.96 (3.24)	8.70 (2.66	0.001	7.49 (3.21)
Benton Judgment of Line Orientation - correct score	19.04 (6.56)	22.12 (4.21)	0.083	20.79 (5.52)
Grooved Pegboard - dominant hand - raw score	122.17 (51.18)	76.15 (19.63)	<0.001	95.05 (42.35)
Grooved Pegboard - non-dominant hand - raw score	133.22 (69.93)	86.03 (35.14)	<0.001	105.41 (56.78)
HKLLT RC - total immediate recall - raw score	23.85 (7.49)	25.73 (5.76)	0.280[d]	24.90 (6.59)
HKLLT RC - total delayed recall (30-min)	6.46 (3.95)	7.82 (2.66)	0.141[d]	7.22 (3.33)
Paced Auditory Serial Addition Test (correct responses)	21.44 (12.44)	30.70 (10.74)	0.004[d]	26.71 (12.30)
Symbol Digit Modulalities Test raw score	33.35 (14.50)	50.73 (11.21)	<0.001	43.07 (15.35)
Trail Making Test A - raw score	81.04 (50.49)	61.06 (76.77)	0.003	69.86 (66.71)
Verbal Fluency - animal - raw score	14.15 (4.72)	18.18 (4.72)	0.001	16.41 (5.10)
Verbal Fluency - verb - raw score	10.19 (5.49)	12.39 (3.71)	0.002	11.42 (4.67)
WCST - perservative errors - raw score	18.42 (12.84)	12.61 (7.10)	0.093	15.17 (10.36)
WCST - conceptual level responses - raw score	22.65 (14.58)	28.79 (17.65)	0.167	26.08 (16.52)
Beck Depression Inventory II - total score	19.60 (11.52)	11.15 (7.97)	0.004	14.79 (10.46)
General life satisfaction scale total score	20.96 (7.49)	26.36 (7.06)	0.007[d]	24.03 (7.68)

a Mann-Whitney U test.
b Pearson's chi-square test.
c Fisher's exact test.
d Student's t test.
* Presented as count (%).
BVMT: Brief Visuospatial Memory Test; HKLLT RC: Hong Kong List Learning Test Random Condition; WCST: Wisconsin Card Sorting Test.

Table 2: Comparison of psychological characteristics PCA factor scores of unemployed and employed MS patients

PCA factor score	Unemployed (n=26) Mean (SD)	Employed (n=33) Mean (SD)	*p*-values[a]
General cognitive function	-0.59 (1.02)	0.46 (0.70)	<0.001
Executive function	0.02 (1.11)	-0.02 (0.91)	0.891[b]
Language	0.03 (1.18)	-0.03 (0.85)	0.861
Motor	0.29 (1.16)	-0.23 (0.78)	0.048
Processing speed	0.07 (0.87)	-0.06 (1.07)	0.625
Psychological well-being	0.19 (0.62)	-0.15 (0.54)	0.033

[a] Mann-Whitney U test.
[b] Student's t test.

was not associated with gender ($p = 0.806$) or age ($p = 0.891$). There was no significant association between employment and disease duration ($p = 0.209$) or frequency of relapses ($p = 0.268$). The employed subjects scored higher than the unemployed subject in BVMT-R (immediate recall, 21.6 vs 15.0, respectively; delayed recall, 8.7 vs 6.0, respectively, $p = 0.001$ for both), GPT (dominant hand, 76.1 vs. 122.2, respectively; non-dominant hand 86.0 vs. 133.2, respectively, p=0.001), PASAT (30 vs. 21, respectively, p=0.004), the Verbal Fluency - animal and -verb tests (animal names in one minute, 18 vs. 14, respectively,p=0.001; verbs in one minute, 12 vs. 10, respectively, p=0.002). The employed subjects had lower BDI-II test scores than those unemployed (11.1 vs. 19.6, respectively, p=0.004). In the General Life Satisfaction Scale Test, employed subjects had higher scores than unemployed subjects (26.4 vs. 20.1, respectively, p= 0.007).

There were 10 missing values in six psychological tests among six MS patients. Little evidence was found that the missing values were missing completely not at random ($p = 0.464$). Most of the neuropsychological tests had association with employment. Table 2 shows a summary of the neuropsychological tests grouped into six components by PCA, namely, general cognitive functions, executive functions, language, motor, processing speed and psychological well-being. The neuropsychological components of general cognitive function, motor and psychological well-being, along with education, duration of symptoms, EDSS, use of interferon therapy and disease subtype were assessed by multivariate logistic regression analyses for further model selection. The final model is shown in Table 3. Compared with patients having less than or equal to five years of symptoms, patients with

Table 3: Association between employment and patients' characteristics: multivariate logistic regression analysis

Independent variable: Employment	OR_{adj} (95% CI)[a]	*p*-values
Duration of symptoms (year)		
≤ 5 (ref.)	1	–
6 - 10	1.165 (0.181, 7.481)	0.872
> 10	7.490 (0.758, 74.045)	0.085
EDSS Total Score		
≤ 5.5 (ref.)	1	–
> 5.5	0.071 (0.003, 1.775)	0.107
General cognitive function	2.657 (2.240, 32.699)	0.002**
Motor [b]	0.353 (0.115, 1.091)	0.070
Psychological well-being [b]	0.421 (0.169, 1.051)	0.067

[a] Adjusted odds ratio derived from multivariate logistic regression.
[b] Lower score means better ability/ well-being.
*p<0.05; **p<0.01.
— Not applicable.
EDSS: Extended Disability Status Scale.

longer symptom duration did not have significant higher odds for employment. The odds ratio (OR) for six to ten year-symptom patients was 1.165 (95% confidence interval (CI)= 0.18 – 7.48) with $p = 0.872$ and OR for more than 10 year-symptom patients was 7.49 (95% CI = 0.76 – 74.05) with $p = 0.085$. The negative association between more severe disability and employment status was not statistically significant, with OR being 0.07 (95% CI = 0.003 – 1.78) with $p = 0.107$. Patients with better cognitive function were more likely to be employed (OR = 2.66, 95% CI = 2.24 – 32.70, $p = 0.002$). Not significant negative associations with employment status were found in lower motor ability (OR = 0.35, 95% CI = 0.12 – 1.10, $p = 0.070$) and poorer psychological well-being (OR = 0.42, 95% CI = 0.17 – 1.05, $p = 0.067$).

DISCUSSION

The employment rate in our MS patient sample was 56%. A study in 18 European countries with 1141 respondents has shown that 694 (61%) of MS patients are employed. The unemployment rate for the general population in Hong Kong (3.8%)[21] is low when compared with the European Union (10.6%).[22] The MS patients in our study found it difficult to remain in the job market. The unemployment percent of MS patients is 44%, 11.5 times higher than the general population, which is 3.8%.[21] When we examined MS patients with long disease duration, 36.4% of the patients with more than 10 years of illness were employed in our study, whereas a study in Norway found that the employment rate of MS patients with a mean duration of 19 years was 45%.[23] MS patient symptoms, workplace environment and financial considerations have been associated with employment status.[24,25] A study in Belgium determined obstacles that prevented MS patients from obtaining employment. The goal was to provide tailor-made vocational guidance for these patients, with input from professionals and organizations at all levels.[26] The study showed that patients with lower age at onset, shorter disease duration, higher level of education, less fatigue symptoms and less disability had better employment rates.[26] The age, gender, level of education level, types of MS, duration of symptoms and frequency of relapse in the previous two years had no significant effect on employment. The discrepancy between our findings and the studies with Western populations was probably due to sample size and empowerment of MS patients.[23-26]

In our study, we did not recruit patients with dementia. If our study recruited patients with MMSE ≤ 21, the employment rate might have been lower. One study found that patients with impaired cognitive function are less likely to be employed.[27] Our study showed that MS patients with better general cognitive function had higher employment rates. Studies from North America, Western Europe, Latin Americahave shown that cognitive impairment is a significant predictor for unemployment.[25,28,29]

Counselling had been suggested to improve employment for MS patients.[30] There are no counselling services or vocational training for MS patients in Hong Kong. Psychological training might be useful, but its usefulness shall be verified.[31] A study in a small patient group did not demonstrate efficacy in providing working memory training.[32]

During our study, we did not encounter any cases of MS patients being forced to retire due to their illness. On many occasions, employers were willing to provide flexible work hours, special toilet facilities and transportation arrangements.[33] The majority of our patients reported that their employers knew they had MS. An Australian study has shown that those who informed their employers stayed longer in the job market even after adjusting for age, gender and level of disability.[34]

In Hong Kong, most patients (88%) visit public hospitals for medical treatment.[35] For patients with chronic illnesses, they will visit both private and public doctors. It is because while the private doctors will have a short waiting time, the public doctors can provide most disease modifying therapies, including interferon at much cheaper rate. In Hong Kong, a visit to public OPD costs US$13 which includes consultation, MRI, and each treatment item costs US$1.3. Hong Kong has no social security system. For the unemployed, they could apply for disability allowance, about USD150 per month if they are considered 100% loss of working capacity. Often patients will visit both private doctor (for swift diagnosis and treatment) and public doctor (for continuation of treatment). From our experience, more than 95% of all MS patients visit public hospitals. The 59 MS patients with similar demographics were evenly recruited from the five public hospitals. However, since our subjects were recruited in the OPD, patients with walking difficulty might not be able to attend the OPD recruitment sessions. There were four SPMS and one PPMS, which might imply selection bias because patients with

SPMS or PPMS infrequently visit the OPD. Furthermore, they had higher chance of cognitive impairment[36], while our study excluded MS patients with evidence of dementia (MMSE < 22).

Employment studies in Asian countries for MS patients could be limited by the low prevalence of MS in this region. Theoretically, multi-centre studies can increase the number of subjects in a study. However, attempts to merge subjects with different backgrounds could influence the study results because job markets vary greatly among different countries. Although the number of MS patients is locally few[4], their employment should be addressed.

DISCLOSURE

Financial support: KM Lau has received a student research stipend for data collection from the Hong Kong Polytechnic University during her MPhil study.

Conflict of interest: None

REFERENCES

1. Simmons RD, Tribe KL, McDonald EA. Living withmultiple sclerosis: Longitudinal changes in employment andthe importance of symptom management. *J Neurol* 2010; 257:926-36.
2. World Health Organization. Atlas multiple sclerosis resources in the world 2008. Geneva: WHO Press; 2008.
3. Wasay M, Khatri IA, Khealani B, Sheerani M. MS in Asian countries. *Int Mult Scl J* 2006; 13(2):58-65.
4. Lau KK, Wong WW, Sheng B, *et al*. The clinical course of multiple sclerosis patients in Hong Kong. *J Neurol Sci* 2008; 268:78-82.
5. Kingwell E, Marriott JJ, Jette N *et al*. Incidence and prevalence of multiple sclerosis in Europe: A systematic review. *BMC Neurology* 2013; 13:128.
6. Kornblith AB, La Rocca NG, Baum HM. Employment in individuals with multiple sclerosis. *Int J Rehabil Res* 1986; 9(2):155-65.
7. Genevie L, Kallos JE, Struenig EL. Job retention among people with multiple sclerosis. *J Neurol Rehabil* 1987; 1:131-5.
8. Census and Statistics Department, Hong Kong Special Administrative Region. 2011 Population census. Available from:http://www.census2011.gov.hk/pdf/summary-results.pdf. Accessed 19 September 2014.
9. Lau KK, Lee PO, Chan KY, Chan YW, Chin KF. Interferon treatment for multiple sclerosis patients in Hong Kong. *Hong Kong Med J* 2000; 6:221-3.
10. Benedict RHB, Schretlen D, Groninger L, Dobraski M, Shpritz B. Revision of the Brief Visuospatial Memory Test: Studies of normal performance, reliability, and validity. *Psychological Assessment* 1996; 8(2):145-53.
11. Benton AL, Hamsher K, Varney NR, Spreen O. Contributions to neuropsychological assessment. New York: Oxford University Press; 1983.
12. Lezak MD. Neuropsychological assessment. New York: Oxford University Press; 1995.
13. Chan AS, Kwok IC. Hong Kong List Learning Test. Hong Kong: Department of Psychology, Chinese University of Hong Kong; 1999.
14. Gronwall D, Sampson H. The psychological effects of concussion. Auckland, New Zealand: Auckland University Press; 1974.
15. Smith A. Symbol Digits Modalities Test: Manual. Los Angeles: Western Psychological Services; 1982.
16. Reitan RM. Trail Making Test: Manual for administrationand scoring. Tucson, Ariz Reitan: Reitan Neuropsychology Laboratory; 1992.
17. Mitrushina MM, Boone KB, D'Elia LF. Handbook of normative data for neuropsychological assessment. New York: Oxford University Press; 1999.
18. Beck AT, Steer RA, Brown GK. Beck Depression Inventory-II (BDI-II). San Antonio, Texas: Psychological Corporation, Harcourt Brace & Company; 1996.
19. Berg EA. A simple objective technique for measuring flexibility in thinking. *J Gen Psychol* 1948; 39:15-22.
20. Leung JP, Leung K. Life satisfaction, self-concept, and relationship with parents in adolescence. *J Youth Adolesc* 1992; 21:653-65.
21. Census and Statistics Department, the Government of the Hong Kong Special Administrative Region. Press release: Unemployment and underemployment statistics for December 2010 - February 2011 [17 Mar 2011], Available from: http://www.censtatd.gov.hk/press_release/pressReleaseDetail.jsp?charsetID=1&pressRID=2712. Accessed 28 August 2014.
22. European Commission Eurostat. Unemployment statistics. Available from: http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Unemployment_statistics. Accessed 19 September 2014.
23. Messmer Uccelli M, Specchia C, Battaglia MA, Miller DM. Factors that influence the employment status of people with multiple sclerosis: A multi-national study. *J Neurol* 2009; 256(12):1989-96.
24. Shields S, Parkes L. Baseline responses of multiple sclerosis patients participating in the proms survey: impact of disease-modifying therapies and support services on patient-reported outcomes. *J Neurol Neurosurgery Psychiatry* 2013; 84(11):e2.
25. O'Connor RJ, Cano SJ, Ramio i Torrenta L, Thompson AJ, Playford ED. Factors influencing work retention for people with multiple sclerosis: Cross-sectional studies using qualitative and quantitative methods. J Neurol 2005; 252:892-6.
26. BøeLunde HM, Telstad W, Grytten N, *et al*. Employment among patients with multiple sclerosis- a population study. *PLos ONE* 2014; 9(7):e103317.
27. Vijverman E, Verdoodt R, Ilsbroukx S. RIMS 2014 – abstracts: Employment of people with MS: A systematic approach and comprehensive questionnaire. *Mult Scler* 2014; 20(7):987-8.
28. Morrow SA, Drake A, Zivadinov R, Munschauer F, Weinstock-Guttman B, Benedict RH. Predicting

loss of employment over three years in multiple sclerosis: Clinically meaningful cognitive decline. *Clin Neuropsychol* 2010; 24(7):1131–45.
29. Caceres F, Vanotti S, Benedict R. Cognitive and neuropsychiatric disorders among multiple sclerosis patients from Latin America: Results of the RELACCEM study. *Multiple Sclerosis and Related Disorders* 2014; 3(3):335-40.
30. Sweetland J, Riazi A, Cano SJ, Playford ED. Vocational rehabilitation services for people with multiple sclerosis: What patients want from clinicians and employers. *Mult Scler* 2007; 13(9):1183-9.
31. Chamberlain MA, Fialka Moser V, SchuldtEkholm K, O'Connor RJ, Herceg M, Ekholm J. Vocational rehabilitation: An educational review. *J Rehabil Med* 2009; 41(11):856-9.
32. Alonso-Magdalena L, Andre-Petersson L, ThulinLandgren A. Systematic working memory training in multiple sclerosis: a pilot study. Multiple sclerosis Conference. Copenhagen, Denmark: 29th Congress of the European Committee for Research and Treatment in Multiple Sclerosis (ECTRIMS) 4 October 2013.
33. Rumrill P, Roessler R, Vierstra C, Hennessey M, Staples L. Workplace barriers and job satisfaction among employed people with multiple sclerosis: An empirical rationale for early intervention. *J Vocat Rehabil* 2004; 20(3):177-83.
34. Kirk-Brown A, Van Dijk P, Simmons R, Bourne M, Cooper B. Disclosure of diagnosis of multiple sclerosis in the workplace positively affects employment status and job tenure. *Mult Scler* 2014; 20(7):871-6.
35. Food and Health Bureau, the Government of the Hong Kong Special Administrative Region. Executive summary: Healthcare reform. Available from:http://www.vhis.gov.hk/doc/sc/full_consultation_document/executive_summary_chn.pdf. Accessed 27May 2015.
36. Achiron A, Polliack M, Rao S, *et al*. Cognitive patterns and progression in multiple sclerosis: construction and validation of percentile curves. *J Neurol Neurosurg Psychiatry* 2005; 76:744-9.