Validation of the LOCOMO-25 in Chinese patients with low back pain and neck pain

Authors: [1]Pansy Pak Ying Siu

[1]Prudence Wing Hang Cheung, BDSc(Hons)

[1]Jason Pui Yin Cheung, MBBS, MMedSc, MS, PDipMDPath, FHKCOS, FHKAM, FRCSEd

Affiliations:

[1]Department of Orthopaedics and Traumatology,

The University of Hong Kong, 102 Pokfulam Road,

Hong Kong, SAR, China

Correspondence: Jason Pui Yin Cheung

Clinical Associate Professor

Department of Orthopaedics and Traumatology

The University of Hong Kong

Queen Mart Hospital, 102 Pokfulam Road, Hong Kong SAR, China

Tel: (+852) 2255-4581

Fax: (+852) 2817-4392

Email: cheungjp@hku.hk

Conflict of Interest: The authors have no conflicts to disclose.

Abstract

Background: The 25-question Geriatric Locomotive Function Scale (LOCOMO-25) was developed to assess any decline in mobility functions. This study aims to validate the LOCOMO-25 in Chinese patients with chronic low back pain and/or neck pain.

Methods: Adult patients with chronic low back pain and/or neck pain completed the LOCOMO-25, SF-36, EQ-5D-5L, ODI, VAS and/or NDI. Internal consistency was assessed by Cronbach's alpha coefficient (α). Test-retest reliability was assessed by intra-class correlation coefficients. Construct validity was assessed by Spearman correlation tests against other outcome measures. Sensitivity to detect differences between groups was assessed by Mann-Whitney U or Kruskal-Wallis H test, where appropriate. Intergroup comparison was performed further in terms of domain scores and their changes at test-retest.

Results: A total of 111 patients were consecutively recruited. LOCOMO-25 demonstrated excellent internal consistency (α=0.915) and test-retest reliability (Intraclass correlation: 0.705 to 0.826). LOCOMO-25 was significantly correlated with all domains of SF-36, EQ-5D, ODI, NDI, and VAS ($p<0.01$). It was found to be sensitive in differentiating between patients with neural compression (32.8±16.9) and without (21.2±12.7), with history of fall(s) within the previous one year (30.8±16.0) and without (24.2±15.1), requires assistive devices for ambulation (40.6±21.6) or independent

(23.6±13.1) and various pain levels (mild: 17.2±10.6; moderate: 23.5±11.7; severe: 38.5±16.5). Patients with neural compression scored significantly higher in the domain of pain and patients requiring assistive devices for ambulation scored significantly higher in the domains of ADL and social functions.

Conclusions: LOCOMO-25 has been validated in Chinese patients with chronic low back and neck pain with satisfactory psychometric properties. There is adequate internal consistency, test-retest reliability, construct validity and sensitivity to detect differences between patients with/without neural compression, different ambulatory statuses and pain severity.

Introduction

Low Back pain (LBP) and neck pain (NP) are common and highly disabling disorders and they may be manifestations of impaired locomotion associated with degeneration, injuries or diseases. The effect of chronic pain (persistent or intermittent pain that lasts more than 3 months) tends to be pervasive and detrimental to quality of life.(1) It reduces patients' physical activity, and leads to reduced productivity and disability. In addition, it restricts patients' leisure activities and social contacts. Many patients may need to cut down their contacts with family and friends due to the physical and emotional burdens associated with chronic pain.(2) In order to help clinicians to gain a comprehensive understanding of the impact of chronic pain and severity of one's locomotive problems, patient-oriented outcome measures are essential.

The 25-question Geriatric Locomotive Function Scale (GLFS-25, also known as LOCOMO-25) was developed to assess the presence of decline in mobility functions due to locomotive organ impairment.(3,4) This *Locomotive Syndrome* indicates any impairment in the musculoskeletal system resulting in pain, limited range of motion, muscle weakness and balance problems.(3) This questionnaire covers a wide range of issues, from pain to quality of life.(4) It was originally written in Japanese and later translated into English **(Appendix A)**.(4) The internal consistency, reliability and validity of LOCOMO-25 was previously evaluated in the Japanese population.(4) Excellent concurrent

validity was shown when correlating LOCOMO-25 with EuroQol-5-dimension 5-level questionnaire (EQ-5D-5L).

The LOCOMO-25 score was identified as significant risk factor for Locomotive Syndrome in the elderly.(5) LOCOMO-25 score was also found to be strongly correlated with a wide range of locomotive disabilities, such as rheumatoid arthritis and lumbar spinal stenosis. Yet, previous studies were conducted in Japan and it has yet to be validated in the Chinese population, especially those with chronic LBP and NP. This is a useful tool to assess the locomotive capabilities of patients who have had a history of fall within the past year and can help determine the ambulatory status and rehabilitation potential of patients undergoing degenerative spine surgery.(6) Hence, this tool has high utility for screening disability and measuring ambulatory outcomes with treatment in Chinese patients, and may even develop into a predictor of rehabilitation outcomes with further study.

As such, the aim of study is to examine the validity and reliability of LOCOMO-25 in a Chinese population with LBP and NP, and to test its correlation with other well-established patient-oriented outcome measures. Our first hypothesis is that LOCOMO-25 is an appropriate patient-reported outcome measure for patients having LBP and/or NP in our southern Chinese population as compared with existing commonly used measures of SF-36 and EQ5D. The SF-36 and EQ5D are important generic quality of life measures for degenerative conditions in the spine.(7-9) In addition, whether LOCOMO-

25 is precise in differentiating patients with or without locomotive function difficulties is also studied.

Materials and Methods

Adult Chinese patients (>18 years old) with chronic (>3 months) LBP and/or NP were consecutively recruited from two specialist spine disorder referral clinics during the period of September to December 2018 in this prospective study. Definition of LBP used was localized pain and discomfort below the costal margin and above the inferior gluteal folds, with or without leg pain. Definition of NP used was pain perceived anywhere in the posterior region of the cervical spine, from the superior nuchal line to the first thoracic spinous process. Exclusion criteria included illiteracy or could not understand Chinese characters. At least 100 subjects were planned to be recruited as it is adequate sample size for assessing measurement properties.(10) Ethics approval was obtained from the local institutional review board.

Demographic data including age, gender, education level (primary or below, secondary, tertiary or above), smoking and drinking history (any habit of smoking and drinking on daily/weekly/monthly basis). Details regarding patient activities and past health was recorded. These included exercise frequency, area and duration of pain, history of fall in the past one-year, surgical history, spinal disorders, comorbidities (hypertension, diabetes mellitus, hyperlipidemia, cardiovascular disease, respiratory disease, mental disorder, malignancies), and ambulatory status.

Subjects who agreed to participate in the study were asked to complete outcome questionnaires

including the LOCOMO-25, 36-Item Short Form Health Survey (SF-36), EuroQol 5-dimension 5-level questionnaire (EQ-5D-5L), Oswestry Disability Index (ODI), and/or Neck Disability Index (NDI). A Visual Analogue Scale (VAS) was also provided for them to score their overall bodily pain of the day of interview. After the baseline scoring, a second testing of all measures (LOCOMO-25, SF-36, EQ-5D-5L, ODI, NDI and VAS) was carried out by phone between the first and second week from the first test.

This LOCOMO-25 questionnaire consists of 25 items, including 4 questions (items 1-4) regarding pain during the last month, 16 questions (items 5-15, 17-21) regarding activities of daily activity living (ADL) during the last month, 3 questions (items 16, 22-23) regarding social functions, and 2 questions (items 24-25) regarding mental health status during the last month. Each item is graded on a five-point scale, from no impairment (0) to severe impairment (4 points), and the total score is derived by the sum of all scores (minimum = 0, maximum = 100). The total score is assumed to represent a quantitative evaluation of the difficulties and disabilities in daily life activity related to locomotive organs.(3,4)

We have translated the original Japanese version of the LOCOMO-25 into traditional Chinese. This process involved double forward translation and a single back translation by independent professional translators, who are native speakers of Cantonese and of local written form of traditional Chinese. After the first forward translation, the translated traditional Chinese version of LOCOMO-25 was reviewed

by a panel of local healthcare professionals, including a spine specialist and allied health professionals. It was then back-translated into Japanese by another professional translator who had no prior knowledge of the original questionnaire. The resultant version then underwent a final forward translation into traditional Chinese, and it was finalized by the review panel **(Appendix B)**.

The internal consistency of LOCOMO-25 was assessed using Cronbach's alpha coefficient (α) with α>0.70 representing adequate internal consistency.(11) Floor or ceiling effects are considered to be present if the respective lowest or highest scores are detected in more than 15% of the subjects.(12) The test-retest reliability of LOCOMO-25 was assessed using intra-class correlation coefficients (ICC, a two-way random effects model for consistency) with 95% confidence interval and minimal detectable difference calculated. This was done at least 1 week after the first test. We tested our first hypothesis with the construct validity of LOCOMO-25, assessed using Spearman's correlation test, against other well-established questionnaires which had been validated in the Chinese population, namely SF-36, EQ-5D-5L, ODI and/or NDI. Correlation coefficient indicates a low correlation with a value of 0.30 to 0.50, a value of 0.50 to 0.70 for a moderate correlation, a high correlation with a coefficient value of 0.70 to 0.90 and a very high correlation for those >0.90.(13) Secondly, the sensitivity of LOCOMO-25 to detect differences between groups with different clinical characteristics was studied using non-parametric tests of Mann-Whitney U or Kruskal-Wallis H test depending on the number of groups being

compared. Factors studied included presence of neural compression, history of spine surgery, history of fall in the past one-year, ambulatory status, pain level, exercise frequency and presence of hypertension. Neural compression was defined as any patient with symptoms of leg pain or numbness with spinal stenosis features on MRI. These factors were studied as they are associated with either mobility function or pain level, which are also measured in LOCOMO-25. Hypertension was studied as its prevalence is higher in patients with chronic pain.(14) The Ambulatory status was dichotomized into 'fully independent' and 'requires assistive devices'. Pain level was divided based on the VAS results: no pain (0-4mm), mild pain (5-44mm), moderate pain (45-74mm) and severe pain (75-100mm). Self-reported exercise frequency was used and was divided into 'always', 'sometimes', 'seldom' and 'never'. Measure of changes were assessed using effect size and standardized response mean for each domain of LOCOMO-25. Data analyses were conducted using the SPSS version 25.0 (Armonk, NY: IBM®) Data was reported as mean ± standard deviation. A p-value <0.05 was considered statistically significant.

Results

A total of 111 (78% female) of patients were consecutively recruited in this study. There were no patients excluded or refused to participate. Test-retest rate was 90.1% with 11 patients (9.9%) withdrawn from the second trial due to inability to contact. Patients' demographics and clinical characteristics are summarized in **table 1**. The mean total score of LOCOMO-25 was 25.9±15.5. The

observed range of scores was 2 to 78. No floor or ceiling effects were found.

The overall internal consistency of LOCOMO-25 was excellent (α=0.915) (**Table 2**). This was comparable to that of outcome measures, namely ODI (α=0.867) and NDI (α=0.916). The domains of ADL and social functions demonstrated excellent internal consistency (with respective α=0.90 and α=0.71). The LOCOMO-25 score (**Table 2**) was found to be significantly correlated ($p<0.01$) with all the domains of SF-36, EQ-5D-5L, VAS, ODI (in patients with LBP only/both LBP and NP), and NDI scores (in patients with both LBP and NP). LOCOMO-25 was found highly and negatively correlated with the domains of physical functioning and physical component summary score of SF-36, with moderate negative correlation with the role physical, bodily pain, vitality and social functioning domains. Strong positive correlations were also found between LOCOMO-25 and ODI and NDI scores. For test-retest reliability, the average of intra-class coefficients (ICC) of items in the four domains ranged from 0.705 to 0.826, which was satisfactory (**Table 3**). This was performed between 7-14 days after the baseline test.

The LOCOMO-25 was found to be sensitive in detecting patients with neural compression (with neural compression: 32.8±16.9 vs without neural compression 21.2±12.7), history of fall(s) within the previous one year (yes: 30.8±16.0 vs no: 24.2±15.1), requires assistive devices for ambulation (requires assistive devices: 40.6±21.6 vs independent: 23.6±13.1) and various pain levels (**Table 4**). However, it

was unable to differentiate previous spine surgery, exercise frequency or hypertension. SF-36 and EQ-5D-5L were also sensitive with worse scores in presence of neural compression, requiring ambulatory assistive devices and worse pain severity. Similarly, they were not sensitive to history of spine surgery and hypertension but SF-36 was sensitive to exercise frequency. **Table 5** shows the average scores in each of the four domains for the groups which could be differentiated by LOCOMO-25, and significant differences were detected in all four domains among patients with various degrees of pain at baseline. Also, significantly different mean domain scores of pain, ADL and social functions were detected from patients of different ambulatory status and those with/without neural compression.

Discussion

Patient-oriented outcome measures are important to facilitate understanding of patient quality of life, which is the major driver of management planning. Hence, in this study, we validated an important functional scale for LBP and NP patients with the LOCOMO-25. It is found to be sensitive to neural compression, history of fall(s) in the previous past one year, different ambulatory statuses and pain severity levels in a Chinese population. We have determined the minimum detected differences for various domains of the LOCOMO-25 score (pain: 2.76, activities of daily living: 6.07, social function: 1.59, mental health status: 2.06). This is an important score that underlines the locomotive capability of patients, potentially providing an insight into the rehabilitation outcome of patients undergoing spine

surgery. This may be a useful tool to structure patient-specific rehabilitation programs and goals.

LOCOMO-25 demonstrated excellent internal consistency and good test-retest reliability, with coefficients higher than the recommended minimum. This is compatible with the results of the previous study conducted in Japan.(4) LOCOMO-25 is not merely a tool for assessing pain but also consists of questions related to daily activities living, social functions, as well as mental health status.(4) In order to evaluate the validity of this new outcome measure, we compared it with other existing outcome measures in the same population. The LOCOMO-25 was found to have significant and strong correlations with EQ-5D-5L, ODI, NDI and the domains of Physical Functioning, Bodily Pain and Physical Composite Summary of SF-36. LOCOMO-25's significant and strong correlation with ODI and NDI confirms its validity as a useful patient-oriented outcome measure in patients with LBP and NP. It is important to note that LOCOMO-25 correlated with NDI weakly and insignificantly in patients with only NP. This may be due to the small sample size of patients who have NP only (7.2%). LOCOMO-25 also had significant yet weaker correlations with VAS score and other domains of SF-36. All these suggest that LOCOMO-25 is valid instrument for assessing physical disabilities. It also includes components that measure mental and social well-being.

LOCOMO-25 is sensitive to detecting differences between patients with/without neural compression, with/without history of fall(s) in the past one year, patients who walk independently/with

the help of assistive devices, and patients with mild, moderate or severe pain levels. Patients with neural compression had significantly higher LOCOMO-25 scores (32.8±16.9 vs 21.2±12.7, $p<0.001$), as well as all domain scores except the mental health status domain. Neurological deficits lead to significantly worse ambulatory function which is commonly seen in lumbar spinal stenosis patients. These patients may also present with variable degrees of back pain as well which combined with leg symptoms contribute to gait disturbances.(15) This relationship also explains why scores are significantly lower in the domain of pain (Difference = 0.591 per item), comparing the other three domains.

Patients who require assistive devices for ambulation also scored significantly higher in LOCOMO-25 (40.6±21.6 vs 23.6±13.1, $p<0.001$), comparing to those who are independent walkers. Majority of the differences came from the domains of ADL and social functions (Difference = 0.788 and 0.607 per item respectively). A previous study found that the ADL ability level relates significantly to ambulatory level and becomes gradually higher as the ambulatory activity level increases.(16) A poor ambulatory level may also limit a person's ability to join social activities that require high-intensity movement, thus reducing the domain score in social function. LOCOMO-25 was also sensitive to detect patients with different pain levels (17.2±10.6 vs 23.5±11.7 vs 38.5±16.5, $p<0.001$). The more severe the pain, the higher the LOCOMO-25 score. The greatest difference originates from the domain of pain. (Difference = mild-moderate: 0.438, moderate-severe: 0.82 per item).

LOCOMO-25 and EQ-5D-5L were unable to differentiate patients with prior spine surgery, exercise frequency and whether they had hypertension though SF-36 was sensitive to patients with different exercise frequency. As patients' medical conditions differ, their surgical outcomes may also differ. Some people may experience complications but some may not. Not to mention the fact that there is also broad variation in short-term and long-term outcome after surgery across different medical centers.(17) All these may explain why patients with previous spine surgery score insignificantly lower than those without spine surgery in LOCOMO-25.

A study conducted in Japan(18) showed that high exercise level had significant associations with a decreased risk of locomotive syndrome, which is defined as a LOCOMO-25 score lower than 16.(4) It is possible that patients who exercise more frequently score lower in LOCOMO-25 as locomotion training like squats and single-leg standing exercises can help preventing decline in locomotive functions. But it is also possible that patients with more severe locomotive disorders are required or encouraged to receive more frequent physiotherapy (which is considered as exercise in this study) to improve their conditions. A prospective follow-up may be required in order to determine the casual relationship between increased or decreased exercise level with increased or decreased severity of locomotive disabilities.

One important limitation of this study is that there is an uneven distribution of gender. A large

proportion of the respondents was female (78%) which may be explained by the higher prevalence of LBP in female.(19) Thus, with a consecutive patient recruitment study design, it is inevitable to recruit more females than males. The LOCOMO-25 should also be studied with a walking test to determine more minor differences between patients and also provide an internal validator of the score. Another limitation is that retesting was done by phone but not in the form of paper-based surveys. The change of interview method may have certain influence on how the patients answer. Although the retesting was performed soon (within 1-2 weeks) after the first test, there may still be an effect if any change in medications was provided. Another factor to consider is the large number of questionnaires applied in this study which may have comprehension difficulties by subjects over the phone. In addition, this study is only representative of Chinese patients. Further validation with larger sample sizes and in other regions and other ethnic groups is required. Prospective follow-up of this patient group should also be performed to study the responsiveness of the outcome measure to disease progression or with interventions. Moreover, the minimal clinical important difference (MCID) for LOCOMO-25 should be studied with a prospective study on specific disease groups.

This study has validated the use of LOCOMO-25 in Chinese patients with LBP and NP. It demonstrated satisfactory psychometric properties, with adequate test-retest reliability, internal consistency, construct validity and sensitivities to detect changes between certain known groups. Future

research should focus on gathering more evidence on applications of the instrument to a larger sample size of patients, and prospective study of the correlation between LOCOMO-25 score and different clinical parameters such as number of fall(s) to see whether or not it can be used as a predictor tool.

References

1. Ashburn MA, Staats PS. Management of chronic pain. Lancet. 1999 May 29;353(9167):1865-9.

2. Dueñas M, Ojeda B, Salazar A, Mico JA, Failde I. A review of chronic pain impact on patients, their social environment and the health care system. J Pain Res. 2016 Jun 28;9:457-67.

3. Nakamura K, Ogata T. Locomotive Syndrome: Definition and Management. Clin Rev Bone Miner Metab. 2016;14(2):56-67.

4. Seichi A, Hoshino Y, Doi T, Akai M, Tobimatsu Y, Iwaya T. Development of a screening tool for risk of locomotive syndrome in the elderly: the 25-question Geriatric Locomotive Function Scale. J Orthop Sci. 2012 Mar;17(2):163-72.

5. Kobayashi K, Ando K, Tsushima M, Machino M, Ota K, Morozumi M, Tanaka S, Kanbara S, Ishiguro N, Hasegawa Y, Imagama S. Predictors of locomotive syndrome in community-living people: A prospective five-year longitudinal study. Mod Rheumatol. 2018 Sep 20:1-7.[Epub]

6. Kimura A, Takeshita K, Inoue H, Seichi A, Kawasaki Y, Yoshii T, Inose H, Furuya T, Takeuchi K, Matsunaga S, Seki S, Tsushima M, Imagama S, Koda M, Yamazaki M, Mori K, Nishimura H, Endo K,

1 Yamada K, Sato K, Okawa A. The 25-question Geriatric Locomotive Function Scale predicts the risk
2 of recurrent falls in postoperative patients with cervical myelopathy. J Orthop Sci. 2018 Jan;23(1):185-
3 9.
4 7. Cheung PWH, Wong CKH, Cheung JPY. Psychometric validation of the cross-culturally adapted
5 traditional Chinese version of the Back Beliefs Questionnaire (BBQ) and Fear-Avoidance Beliefs
6 Questionnaire (FABQ). Eur Spine J. 2018 Aug;27(8):1724-33.
7 8. Cheung PWH, Wong CKH, Cheung JPY. Psychometric validation of the adapted Traditional
8 Chinese version of the Japanese Orthopaedic Association Back Pain Evaluation Questionnaire
9 (JOABPEQ). J Orthop Sci. 2018 Sep;23(5):750-7.
10 9. Cheung PWH, Wong CKH, Cheung JPY. Differential Psychometric Properties of EuroQoL 5-
11 Dimension 5-Level and Short-Form 6-Dimension Utility Measures in Low Back Pain. Spine (Phila Pa
12 1976). 2019 Jun 1;44(11):E679-E686.
13 10. Terwee CB, Bot SD, de Boer MR, van der Windt DA, Knol DL, Dekker J, Bouter LM, de Vet HC.
14 Quality criteria were proposed for measurement properties of health status questionnaires. J Clin
15 Epidemiol. 2007 Jan;60(1):34-42.
16 11. McKennell A. ATTITUDE MEASUREMENT: USE OF COEFFICIENT ALPHA WITH
17 CLUSTER OR FACTOR ANALYSIS. Sociol. 1970;4(2):227-45.

12. McHorney CA, Tarlov AR. Individual-patient monitoring in clinical practice: are available health status surveys adequate? Qual Life Res. 1995 Aug;4(4):293-307.

13. Hinkle DE, Wiersma W, Jurs SG. Applied Statistics for the Behavioral Sciences. 5th ed. Boston: Houghton Mifflin; 2003.

14. Bruehl S, Chung OY, Jirjis JN, Biridepalli S. Prevalence of clinical hypertension in patients with chronic pain compared to nonpain general medical patients. Clin J Pain. 2005 Mar-Apr;21(2):147-53.

15. Covaro A, Vila-Canet G, de Frutos AG, Ubierna MT, Ciccolo F, Caceres E. Management of degenerative lumbar spinal stenosis: an evidence-based review. EFORT Open Rev. 2017 Mar 13;1(7):267-74.

16. Sato S, Demura S, Kobayashi H, Goshi F, Minami M, Nagasawa Y, Yamaji S. Characteristics of ADL ability on partially dependent older adults: comparison among different ambulatory activities levels. Appl Human Sci. 1999 Sep;18(5):169-74.

17. Desai A, Bekelis K, Ball PA, Lurie J, Mirza SK, Tosteson TD, Zhao W, Weinstein JN. Variation in outcomes across centers after surgery for lumbar stenosis and degenerative spondylolisthesis in the spine patient outcomes research trial. Spine (Phila Pa 1976). 2013 Apr 15;38(8):678-91.

18. Kim YS, Suehara Y, Ishii M, Kawasaki T, Matsuoka K, Okubo T, Okubo N, Tanabe Y, Akaike K, Mukaihara K, Kubota D, Maruyama Y, Saito T, Kaneko K. A Comparative Study of 2 Screening Tools

for Locomotive Syndrome (The “Loco-check” and the “GLFS-25”): An Orthopedic Outpatient-based Survey. Br J Med Med Res. 2016;17:1-13.

19. Bailey A. Risk factors for low back pain in women: still more questions to be answered. Menopause. 2009 Jan-Feb;16(1):3-4.

References

1. Ashburn MA, Staats PS. Management of chronic pain. Lancet 1999;353:1865-9.

2. Dueñas M, Ojeda B, Salazar A, Mico JA, Failde I. A review of chronic pain impact on patients, their social environment and the health care system. J Pain Res 2016;9:457-67.

3. Nakamura K, Ogata T. Locomotive Syndrome: Definition and Management. Clin Rev Bone Miner Metab 2016;14:56-67.

4. Seichi A, Hoshino Y, Doi T, Akai M, Tobimatsu Y, Iwaya T. Development of a screening tool for risk of locomotive syndrome in the elderly: the 25-question Geriatric Locomotive Function Scale. J Orthop Sci 2012;17:163-72.

5. Kobayashi K, Ando K, Tsushima M, Machino M, Ota K, Morozumi M, Tanaka S, Kanbara S, Ishiguro N, Hasegawa Y, Imagama S. Predictors of locomotive syndrome in community-living people: A prospective five-year longitudinal study. Mod Rheumatol 2018:1-7.

6. Kimura A, Takeshita K, Inoue H, Seichi A, Kawasaki Y, Yoshii T, Inose H, Furuya T, Takeuchi K, Matsunaga S, Seki S, Tsushima M, Imagama S, Koda M, Yamazaki M, Mori K, Nishimura H, Endo K, Yamada K, Sato K, Okawa A. The 25-question Geriatric Locomotive Function Scale predicts the risk of recurrent falls in postoperative patients with cervical myelopathy. J Orthop Sci 2018;23:185-9.

7. Cheung PWH, Wong CKH, Cheung JPY. Psychometric validation of the cross-culturally adapted traditional Chinese version of the Back Beliefs Questionnaire (BBQ) and Fear-Avoidance Beliefs Questionnaire (FABQ). Eur Spine J 2018;27:1724-33.

8. Cheung PWH, Wong CKH, Cheung JPY. Psychometric validation of the adapted Traditional Chinese version of the Japanese Orthopaedic Association Back Pain Evaluation Questionnaire (JOABPEQ). J Orthop Sci 2018;23:750-7.

9. Cheung PWH, Wong CKH, Cheung JPY. Differential Psychometric Properties of EuroQoL 5-Dimension 5-Level and Short-Form 6-Dimension Utility Measures in Low Back Pain. Spine (Phila Pa 1976)

2018.

10. Terwee CB, Bot SD, de Boer MR, van der Windt DA, Knol DL, Dekker J, Bouter LM, de Vet HC. Quality criteria were proposed for measurement properties of health status questionnaires. J Clin Epidemiol 2007;60:34-42.

11. McKennell A. ATTITUDE MEASUREMENT: USE OF COEFFICIENT ALPHA WITH CLUSTER OR FACTOR ANALYSIS. Sociol 1970;4:227-45.

12. McHorney CA, Tarlov AR. Individual-patient monitoring in clinical practice: are available health status surveys adequate? Qual Life Res 1995;4:293-307.

13. Hinkle DE, Wiersma W, Jurs SG. Applied Statistics for the Behavioral Sciences. 5th ed. Boston: Houghton Mifflin; 2003.

14. Bruehl S, Chung OY, Jirjis JN, Biridepalli S. Prevalence of clinical hypertension in patients with chronic pain compared to nonpain general medical patients. Clin J Pain 2005;21:147-53.

15. Covaro A, Vila-Canet G, de Frutos AG, Ubierna MT, Ciccolo F, Caceres E. Management of degenerative lumbar spinal stenosis: an evidence-based review. EFFORT Open Rev 2016;1:267-74.

16. Sato S, Demura S, Kobayashi H, Goshi F, Minami M, Nagasawa Y, Yamaji S. Characteristics of ADL ability on partially dependent older adults: comparison among different ambulatory activities levels. Appl Human Sci 1999;18:169-74.

17. Desai A, Bekelis K, Ball PA, Lurie J, Mirza SK, Tosteson TD, Zhao W, Weinstein JN. Variation in outcomes across centers after surgery for lumbar stenosis and degenerative spondylolisthesis in the spine patient outcomes research trial. Spine (Phila Pa 1976) 2013;38:678-91.

18. Kim YS, Yoshiyuki & Ishii, Midori & Kawasaki, Takayuki & Matsuoka, Kiyoshi & Okubo, Taketo & Okubo, Naoko & Tanabe, Yu & Akaike, Keisuke & Mukaihara, Kenta & Kubota, Daisuke & Maruyama, Yuichiro & Saito, Tsuyoshi & Kaneko, Kazuo. A Comparative Study of 2 Screening Tools for Locomotive Syndrome (The “Loco-check” and the “GLFS-25”): An Orthopedic Outpatient-based Survey. Br J Med Med

Res 2016;17:1-13.

19. Bailey A. Risk factors for low back pain in women: still more questions to be answered. Menopause (New York, NY) 2009;16:3-4.

Table 1: Demographic and clinical characteristics

Variable	Subcategory	Total (number =111) Percentage (number)
Age	Mean ± Standard Deviation	56.3±10.3
	20-29	0.9% (1)
	30-39	7.2% (8)
	40-49	15.3% (17)
	50-59	36.0% (40)
	60-69	32.4% (36)
	70-79	8.1% (9)
Gender	Male	21.6% (24)
	Female	78.4% (87)
Education level	Primary or below	29.7% (33)
	Secondary	45.9% (51)
	Tertiary or above	24.3% (27)
Smoking status	Current smoker	5.4% (6)
	Ex-smoker	1.8% (2)
	No	92.8% (103)
Drinking status	Yes	9.9% (11)
	No	90.1% (100)
Exercise Frequency	Always	20.7% (23)
	Sometimes	20.7% (23)
	Seldom	30.6% (34)
	Never	27.9% (31)
Area of Pain	Neck pain only	7.2% (8)
	Back pain only	48.6% (54)
	Neck and Back pain	44.1% (49)
	Upper Limb Pain	54.1% (60)
	Lower Limb Pain	81.1% (90)
Pain Level (VAS)	No Pain (0-4mm)	0.0% (0)
	Mild Pain (5-44mm)	32.4% (36)
	Moderate Pain (45-74mm)	37.8% (42)
	Severe Pain (75-100mm)	29.7% (33)
History of fall in past year	Yes	25.2% (28)
	No	74.8% (83)

Surgical History	Spine surgery	21.6% (24)
	Knee/Hip Replacement	2.7% (3)
Spine Disease	Presence of neural compression	40.5% (45)
	No neural compression	59.5% (66)
Comorbidities	None	13.5% (15)
	Hypertension	24.3% (27)
	Diabetes Mellitus	14.4% (16)
	Hyperlipidemia	22.5% (25)
	Cardiovascular disease	8.1% (9)
	Respiratory disease	8.1% (9)
	Mental disorder	14.4% (16)
	Malignancy	9.0% (10)
Ambulatory Status	Fully independent	86.5% (96)
	Requires assistive devices	13.5% (15)

Table 2: Internal Consistency and construct validity of LOCOMO-25

		Cronbach's alpha	LOCOMO-25 Score	SF-36										VAS Score
				PF	RP	BP	GH	VT	SF	RE	MH	PCS	MCS	
LOCOMO-25		0.915	-	-	-	-	-	-	-	-	-	-	-	0.580**
SF-36 Score	PF	0.856	-0.800**	-	-	-	-	-	-	-	-	-	-	-0.340**
	RP	0.777	-0.531**	-	-	-	-	-	-	-	-	-	-	-0.215*
	BP	0.607	-0.688**	-	-	-	-	-	-	-	-	-	-	-0.599**
	GH	0.676	-0.391**	-	-	-	-	-	-	-	-	-	-	-0.073
	VT	0.854	-0.506**	-	-	-	-	-	-	-	-	-	-	-0.313**
	SF	0.788	-0.590**	-	-	-	-	-	-	-	-	-	-	-0.285**
	RE	0.815	-0.385**	-	-	-	-	-	-	-	-	-	-	-0.311**
	MH	0.865	-0.355**	-	-	-	-	-	-	-	-	-	-	-0.339**
	PCS	-	-0.766**	-	-	-	-	-	-	-	-	-	-	-0.306**
	MCS	-	-0.363**	-	-	-	-	-	-	-	-	-	-	-0.339**
EQ-5D-5L Score		0.830	-0.781**	0.703**	0.572**	0.641**	0.299**	0.507**	0.578**	0.402**	0.397**	0.685**	0.411**	-0.561**
ODI Score	LBP only	0.867	0.826**	-0.818**	-0.632**	-0.629**	-0.367**	-0.577**	-0.682**	-0.481**	-0.530**	-0.751**	-0.528**	0.513**
	LBP & NP		0.820**	-0.791**	-0.664**	-0.752**	-0.562**	-0.622**	-0.708**	-0.471**	-0.519**	-0.765**	-0.481**	0.365*
NDI Score	NP only	0.916	0.434	-0.187	-0.781*	-0.315	-0.418	-0.175	-0.376	-0.138	-0.164	-0.563	-0.012	0.216
	LBP & NP		0.703**	-0.633**	-0.625**	-0.650**	-0.495**	-0.609**	-0.682**	-0.576**	-0.540**	-0.583**	-0.557**	0.338*

Internal Consistency of domains of LOCOMO-25

Domain	Number of items	Mean scores (SD)	Range	Cronbach's alpha
Pain (Item 1-4)	4	6.88 (3.15)	15.0	0.64
Activities of Daily Living (Item 5-15,17-21)	16	14.27 (10.37)	47.0	0.90
Social Functions (Item 16,22-23)	3	2.21 (2.54)	9.0	0.71
Mental Health Status (Item 24-25)	2	2.51 (2.32)	8.0	0.65

SF-36 36-Item Short Form Health Survey *EQ-5D-5L* EuroQol 5-dimension 5-level questionnaire, *ODI* Oswestry Disability Index, *NDI* Neck Disability Index, *VAS* Visual Analogue Scale, *NP* neck Pain, *LBP* low back pain, *PF* physical functioning, *RP* role physical, *BP* bodily pain, *GH* general health, *VT* vitality, *SF* social functioning, *RE* role emotional, *MH* mental health, *PCS* physical composite summary, *MCS* mental composite summary

* Spearman's correlation coefficient with statistical significance at 0.05 level (2-tailed)

** Spearman's correlation coefficient with statistical significance at 0.01 level (2-tailed)

Table 3: Test-retest reliability of LOCOMO-25

Domain	Intra-class correlation coefficient	95% Confidence Interval	Minimum detected difference
Pain (Items 1-4)	0.726	0.602 - 0.812	2.76
Activities of daily living (Items 5-15, 17-21)	0.854	0.787 – 0.900	6.07
Social Function (Items 16,22-23)	0.880	0.825 – 0.918	1.59
Mental Health Status (Items 24-25)	0.843	0.772 – 0.892	2.06

Table 4: Sensitivity of LOCOMO-25 and other questionnaire to detect differences between groups

		Presence of neural compression			History of fall(s) in the past one year			History of previous spine surgery			Ambulatory Status		
		Yes (N=45)	No (N=66)		Yes (N=28)	No (N=83)		Yes (N=25)	No (N=86)		Independent (N=96)	Requires assistive device (N=15)	
		Mean±SD	Mean±SD	P-value	Mean±SD	Mean±SD	P-value	Mean±SD	Mean±SD	P-value	Mean±SD	Mean±SD	P-value
LOCOMO-25		32.8±16.8	21.2±12.7	<0.001**	30.8±16.0	24.2±15.1	0.031*	23.1±11.3	26.7±16.5	0.523	23.6±13.1	40.6±21.6	0.002**
SF36	PF	55.0±20.1	64.2±21.6	0.027*	52.7±23.5	63.0±20.4	0.035*	60.0±17.8	60.6±22.7	0.793	63.4±20.3	41.7±21.4	0.001**
	RP	20.5±30.8	28.0±34.7	0.176	17.0±29.7	27.7±34.0	0.086	32.0±31.9	23.0±33.5	0.098	26.8±33.9	13.3±26.5	0.100
	BP	33.7±17.6	42.8±16.4	0.022*	37.9±17.4	39.5±17.5	0.577	41.4±16.8	38.5±17.6	0.604	40.1±16.6	32.7±21.4	0.078
	GH	27.0±22.7	29.9±21.0	0.376	23.9±18.1	30.4±22.6	0.196	34.4±27.2	27.1±19.7	0.231	28.2±21.8	32.2±21.3	0.462
	VT	37.1±23.3	45.4±27.1	0.109	37.1±24.3	43.7±26.3	0.293	46.0±27.9	40.9±25.3	0.424	42.0±25.4	42.0±29.7	0.924
	SF	56.8±30.7	69.0±25.3	0.034*	55.5±26.5	66.9±28.3	0.051	64.3±26.7	64.0±28.7	0.980	64.9±27.4	58.6±32.8	0.453
	RE	40.0±42.4	58.1±41.9	0.029*	46.4±42.0	52.2±43.3	0.517	49.3±46.3	51.2±42.1	0.847	50.3±42.8	53.3±45.1	0.814
	MH	55.8±25.4	63.3±23.7	0.101	58.9±25.3	60.8±24.4	0.836	62.2±25.4	59.7±24.4	0.574	60.3±23.8	59.7±30.0	0.948
	PCS	32.0±7.4	34.7±8.3	0.074	30.9±7.71	34.5±7.94	0.012*	34.9±6.91	33.2±8.29	0.256	34.4±7.7	28.2±8.02	0.002**
	MCS	42.9±13.6	47.7±12.3	0.075	44.6±12.5	46.2±13.2	0.573	46.1±14.2	45.7±12.7	0.714	45.6±12.6	47.2±16.0	0.496
EQ-5D-5L		0.554±0.340	0.707±0.255	0.006**	0.551±0.359	0.677±0.273	0.083	0.687±0.305	0.633±0.300	0.291	0.694±0.256	0.333±0.381	<0.001**

Table 4: Sensitivity of LOCOMO-25 and other questionnaire to detect differences between groups (continued)

		Pain Level				Exercise Frequency					Presence of hypertension		
		Mild (N=36) Mean±SD	Moderate (N=42) Mean±SD	Severe (N=33) Mean±SD	P-value	Never (N=31) Mean±SD	Seldom (N=34) Mean±SD	Sometimes (N=23) Mean±SD	Always (N=23) Mean±SD	P-value	Yes (N=27) Mean±SD	No (N=84) Mean±SD	P-value
LOCOMO-25		17.2±10.6	23.5±11.7	38.5±16.5	<0.001**	23.2±12.9	26.4±15.6	28.9±18.1	25.7±16.2	0.830	28.4±15.6	25.1±15.5	0.317
SF36	PF	67.9±19.8	62.3±20.6	50.0±21.3	0.004**	61.3±23.2	59.9±20.9	60.9±19.0	59.8±24.2	0.997	57.4±20.8	61.4±21.9	0.359
	RP	30.6±36.9	29.2±34.9	13.6±23.5	0.089	44.4±38.6	22.1±30.6	5.43±13.0	22.8±31.0	<0.001**	25.9±35.0	24.7±32.8	0.970
	BP	49.6±14.3	39.6±15.7	27.1±15.1	<0.001**	43.9±16.8	36.1±16.2	33.1±15.9	43.2±19.6	0.125	39.6±17.6	39.0±17.4	0.849
	GH	29.5±24.9	29.7±21.2	26.7±18.9	0.818	27.7±21.4	25.6±18.4	30.3±21.5	33.0±26.8	0.835	25.6±22.1	29.8±21.6	0.350
	VT	49.2±24.2	44.0±28.1	31.7±21.7	0.013*	47.6±26.2	36.2±25.6	38.3±19.6	47.0±30.0	0.261	42.6±24.9	41.8±26.3	0.770
	SF	72.4±23.2	63.9±28.2	55.1±30.9	0.058	77.2±22.2	56.1±29.4	54.0±28.8	68.0±26.3	0.005**	68.7±26.2	62.5±28.7	0.336
	RE	64.8±42.9	52.4±42.4	33.3±38.2	0.010**	63.5±43.4	40.2±39.2	40.6±44.9	59.4±41.1	0.071	64.2±41.3	46.4±42.7	0.069
	MH	69.8±19.8	60.5±25.9	49.7±23.9	0.004**	69.3±24.5	52.9±24.2	52.9±22.2	66.4±23.0	0.011*	64.1±25.3	59.0±24.3	0.281
	PCS	35.6±8.61	34.4±8.13	30.3±6.17	0.020*	35.2±9.55	33.6±6.85	31.8±4.68	33.2±9.83	0.644	32.1±7.61	34.1±8.11	0.277
	MCS	50.4±10.9	45.9±13.5	40.5±12.8	0.005**	50.9±12.1	41.5±12.7	41.9±13.2	49.1±11.8	0.005**	49.3±13.1	44.7±12.9	0.087
EQ-5D-5L		0.800±0.134	0.685±0.258	0.426±0.356	<0.001**	0.698±0.298	0.640±0.331	0.551±0.299	0.676±0.249	0.92	0.639±0.303	0.647±0.301	0.887

SF-36 36-Item Short Form Health Survey, *EQ-5D-5L* EuroQol 5-dimension 5-level questionnaire, *PF* physical functioning, *RP* role physical, *BP* bodily pain, *GH* general health, *VT* vitality, *SF* social functioning, *RE* role emotional, *MH* mental health, *PCS* physical composite summary, *MCS* mental composite summary

By Mann-Whitney U or Kruskal-Wallis H test, where appropriate

*Correlation is significant at 0.05 level (2-tailed)

**Correlation is significant at 0.01level (2-tailed)

Table 5: Intergroup comparison of LOCOMO-25 scores in each of the 4 domains and measure of changes

Domain	At baseline				After test retest			
	Presence of neural compression			Mann-Whitney U	Effect size		Standardized response mean	
	Yes (N=45) Mean	No (N=66) Mean	Absolute difference per item	p-value	Yes	No	Yes	No
Pain	8.29	5.92	0.591	<0.001**	0.052	0.019	0.077	0.027
Activities of Daily Living	18.4	11.4	0.439	<0.001**	0.032	0.098	0.073	0.217
Social Functions	3.02	1.67	0.452	0.009*	0.000	0.016	0.000	0.030
Mental Health Status	3.02	2.17	0.428	0.102	0.207	0.097	0.328	0.153
	Ambulatory Status							
	Independent (N=96) Mean	Requires assistive device (N=15) Mean	Absolute difference per item	p-value	Independent	Requires assistive device	Independent	Requires assistive device
Pain	6.62	8.53	0.478	0.039*	0.027	0.087	0.041	0.098
Activities of Daily Living	12.6	25.2	0.788	0.001**	0.072	0.079	0.155	0.126
Social Functions	1.97	3.79	0.607	0.028*	0.034	0.179	0.070	0.351
Mental Health Status	2.43	3.07	0.32	0.441	0.035	0.117	0.051	0.247

Table 5: Intergroup comparison of LOCOMO-25 scores in each of the 4 domains and measure of changes (continued)

Domain	At baseline					After test retest					
	Pain				Mann-Whitney U	Effect size			Standardized response mean		
	Mild (N=36) Mean	Moderate (N=42) Mean	Severe (N=33) Mean	Absolute difference per item (mild-moderate; moderate-severe)	p-value	Mild	Moderate	Severe	Mild	Moderate	Severe
Pain	4.73	6.48	9.76	0.44; 0.82	<0.001**	0.180	0.044	0.237	0.192	0.055	0.333
Activities of Daily Living	8.92	12.77	22.0	0.24; 0.58	<0.001**	0.161	0.037	0.046	0.363	0.069	0.097
Social Functions	1.72	1.85	3.21	0.04; 0.45	0.046*	0.122	0.045	0.022	0.267	0.076	0.063
Mental Health Status	1.81	2.36	3.48	0.28; 0.56	0.026*	0.160	0.051	0.049	0.210	0.065	0.098

Locomo-25	After test retest	
Domain	Effect size	Standardized response mean
Pain	0.032	0.050
Activities of Daily Living	0.063	0.149
Social Functions	0.008	0.017
Mental Health Status	0.043	0.067

* statistical significance at 0.05 level; ** statistical significance at 0.01 level

Appendix A: English version of LOCOMO-25

25-question risk assessment

Over the past month, have you experienced any pain or had difficulties with activities of daily living? Please answer the following 25 questions to help determine your risk of locomotive syndrome

Following are questions about your body pain for the last one month:						
Q1	Did you have any pain (including numbness) in your neck or upper limbs(shoulders, arms, or hand)?	No pain	Mild pain	Moderate pain	Considerable pain	Severe pain
Q2	Did you have any pain in your back, lower back or buttocks?	No pain	Mild pain	Moderate pain	Considerable pain	Severe pain
Q3	Did you have any pain (including numbness) in your lower limbs (hip, thigh, knee, calf, shin, ankle, or foot)?	No pain	Mild pain	Moderate pain	Considerable pain	Severe pain
Q4	To what extent has it been painful to move your body in daily life?	No pain	Mild pain	Moderate pain	Considerable pain	Severe pain
Following are questions about your usual daily life for the last one month:						
Q5	To what extent has it been difficult to get up from a bed or lie down?	Not difficult	Mildly difficult	Moderately difficult	Considerably difficult	Extremely difficult
Q6	To what extent has it been difficult to stand up from a chair?	Not difficult	Mildly difficult	Moderately difficult	Considerably difficult	Extremely difficult
Q7	To what extent has it been difficult to walk inside the house?	Not difficult	Mildly difficult	Moderately difficult	Considerably difficult	Extremely difficult
Q8	To what extent has it been difficult to put on and take off shirts?	Not difficult	Mildly difficult	Moderately difficult	Considerably difficult	Extremely difficult
Q9	To what extent has it been difficult to put on and take off trousers and pants?	Not difficult	Mildly difficult	Moderately difficult	Considerably difficult	Extremely difficult
Q10	To what extent has it been difficult to use the toilet?	Not difficult	Mildly difficult	Moderately difficult	Considerably difficult	Extremely difficult
Q11	To what extent has it been difficult to wash your body in the bath?	Not difficult	Mildly difficult	Moderately difficult	Considerably difficult	Extremely difficult
Q12	To what extent has it been difficult to go up and down stairs?	Not difficult	Mildly difficult	Moderately difficult	Considerably difficult	Extremely difficult
Q13	To what extent has it been difficult to walk briskly?	Not difficult	Mildly difficult	Moderately difficult	Considerably difficult	Extremely difficult
Q14	To what extent has it been difficult to keep yourself neat?	Not difficult	Mildly difficult	Moderately difficult	Considerably difficult	Extremely difficult
Q15	How far can you keep walking without rest? (please select the closest answer)	More than 2-3 km	approximately 1 km	approximately 300 m	approximately 100 m	approximately 10 m

Q16	To what extent has it been difficult to go out to visit neighbors?	Not difficult	Mildly difficult	Moderately difficult	Considerably difficult	Extremely difficult
Q17	To what extent has it been difficult to carry objects weighing approximately 2 kilograms (2 standard milk bottles or 2 PET bottles each containing 1 liter)?	Not difficult	Mildly difficult	Moderately difficult	Considerably difficult	Extremely difficult
Q18	To what extent has it been difficult to go out using public transportation?	Not difficult	Mildly difficult	Moderately difficult	Considerably difficult	Extremely difficult
Q19	To what extent have simple tasks and housework (preparing meals, cleaning up, etc.) been difficult?	Not difficult	Mildly difficult	Moderately difficult	Considerably difficult	Extremely difficult
Q20	To what extent have load-bearing tasks and housework (cleaning the yard, carrying heavy bedding, etc.) been difficult?	Not difficult	Mildly difficult	Moderately difficult	Considerably difficult	Extremely difficult
Q21	To what extent has it been difficult to perform sports activity (jogging, swimming, gate ball, dancing, etc.)?	Not difficult	Mildly difficult	Moderately difficult	Considerably difficult	Extremely difficult
Q22	Have you been restricted from meeting your friends?	Not restricted	Slightly restricted	Restricted about half the time	Considerably restricted	Gave up all activities
Q23	Have you been restricted from joining social activities (meeting friends, playing sport, engaging in activities and hobbies, etc.)?	Not restricted	Slightly restricted	Restricted about half the time	Considerably restricted	Gave up all activities
Q24	Have you ever felt anxious about falls in your house?	Have not felt anxious	Have occasionally felt anxious	Have sometimes felt anxious	Have often felt anxious	Have constantly felt anxious
Q25	Have you ever felt anxious about being unable to walk in the future?	Have not felt anxious	Have occasionally felt anxious	Have sometimes felt anxious	Have often felt anxious	Have constantly felt anxious
Enter the number of answers		0 points =	1 point =	2 point =	3 point =	4 point =
Add up the number of points		Total points				

Appendix B: Chinese version of LOCOMO-25

運動障礙症候群 25

在這一個月裡,您的身體是否出現過疼痛症狀,日常生活是否感到不便? 請回答以下 25 個問題,
以此來檢查您的運動障礙症候群嚴重度。

這一個月裡的身體疼痛等症狀相關提問。						
Q1	頸部、肩部、手臂、手的某處是否感到過疼痛(包括麻木症狀)?	不痛	稍微痛	中度疼痛	很痛	非常痛
Q2	背部、腰部、臀部的某處是否感到過疼痛?	不痛	稍微痛	中度疼痛	很痛	非常痛
Q3	下肢(大腿根、大腿、膝蓋、腿肚子、小腿部、腳踝、 腳) 的某處是否感到過疼痛(包括麻木症狀)?	不痛	稍微痛	中度疼痛	很痛	非常痛
Q4	在日常生活中活動身體時感到困難的程度有多大?	不困難	稍微困難	中度困難	很困難	非常困難
這一個月裡的日常生活狀況相關提問。						
Q5	從床上坐起或躺下時感到困難的程度有多大?	不困難	稍微困難	中度困難	很困難	非常困難
Q6	從坐姿站起時感到困難的程度有多大?	不困難	稍微困難	中度困難	很困難	非常困難
Q7	在家中走動時感到困難的程度有多大?	不困難	稍微困難	中度困難	很困難	非常困難
Q8	穿脫襯衣時感到困難的程度有多大?	不困難	稍微困難	中度困難	很困難	非常困難
Q9	穿脫褲子和內褲時感到困難的程度有多大?	不困難	稍微困難	中度困難	很困難	非常困難
Q10	如廁時感到困難的程度有多大?	不困難	稍微困難	中度困難	很困難	非常困難
Q11	在洗澡間清洗身體時感到困難的程度有多大?	不困難	稍微困難	中度困難	很困難	非常困難
Q12	上下樓梯時感到困難的程度有多大?	不困難	稍微困難	中度困難	很困難	非常困難
Q13	快速行走時感到困難的程度有多大?	不困難	稍微困難	中度困難	很困難	非常困難
Q14	出門之前穿戴著裝時感到困難的程度有多大?	不困難	稍微困難	中度困難	很困難	非常困難
Q15	可不休息地持續行走多長距離?(請選擇最接近的距離)。	2~3km以上	1km左右	300m左右	100m左右	10m左右
Q16	外出到住家附近時感到困難的程度有多大?	不困難	稍微困難	中度困難	很困難	非常困難
Q17	買2kg左右的東西拿回家時(相當於約2瓶1公升的牛奶) 感到困難的程度有多大?	不困難	稍微困難	中度困難	很困難	非常困難

Q18	乘坐列車或公車出門時感到困難的程度有多大?	不困難	稍微困難	中度困難	很困難	非常困難
Q19	做簡單的家事時(準備和收拾飯菜,簡單的清掃整理等) 感到困難的程度有多大?	不困難	稍微困難	中度困難	很困難	非常困難
Q20	做稍微繁重的家事時(使用吸塵器,拿放被褥等) 感到困難的程度有多大?	不困難	稍微困難	中度困難	很困難	非常困難
Q21	做運動或跳舞(慢跑、游泳、門球、舞蹈等)時感到困難的程度有多大?	不困難	稍微困難	中度困難	很困難	非常困難
Q22	是否特意減少和親人朋友的往來呢?	沒有減少	稍微減少	中度減少	減少很多	完全不往來
Q23	是否特意減少參加地區的活動和聚會呢?	沒有減少	稍微減少	中度減少	減少很多	完全不往來
Q24	是否會害怕在家中摔倒而感到不安呢?	不會不安	稍微不安	中度不安	很不安	非常不安
Q25	是否會害怕將來無法行走而感到不安呢?	不會不安	稍微不安	中度不安	很不安	非常不安
請記錄回答數		0分=	1分=	2分=	3分=	4分=
請統計回答結果		合計 分				