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Research article

Thai Version of the Activities-Specific Balance Confidence Scale: Reliability and Validity among Women Undergoing Cancer Chemotherapy

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Abstract

Background: The Thai version of the Activities-specific Balance Confidence (ABC) scale is commonly used to assess balance confidence in many populations. However, no studies have examined the psychometric properties of the Thai version of the ABC scale among women with cancer who received neurotoxic chemotherapy.

Objective: To investigate the test–retest reliability and concurrent validity of the Thai version of the ABC scale among women with cancer who received neurotoxic chemotherapy.

Method: Thirty-one women with cancer participated in this study. We assessed the test–retest reliability of the Thai version of the ABC scale using the intraclass correlation coefficient (ICC). We also examined the standard error of measurement (SEM) and the minimal detectable change (MDC). We also used the Spearman correlation coefficient to assess the concurrent validity of the Thai version of the ABC scale, the Time Up and Go test (TUG), and the Fullerton Advanced Balance scale (FAB).

Results: The test–retest reliability of the total ABC-16 and ABC-6 scale was excellent (ICC = 0.99 and ICC = 0.96, respectively). The concurrent validity of the Thai version of the ABC-16 and ABC-6 scale was significantly correlated with the TUG score but not the FAB score.

Conclusions: Our results indicate that the Thai version of the ABC-16 scale is a reliable and valid measurement of balance confidence in Thai women with cancer. The excellent reliability of the ABC-6 makes it suitable for use in busy clinical or academic settings.

Keywords: Balance, Cancer, Neurotoxic Chemotherapy

Introduction

Cancer is now the second leading cause of mortality in the world (8.97 million deaths annually), surpassed only by cardiovascular disease. However, it is on track to become the most common cause of death (18.63 million deaths) by 2060.[1] Chemotherapy is the most effective and widely used cancer treatment, and is applied in most patients.[2] Taxane- and platinum-based forms of chemotherapy are commonly used to treat breast, ovarian, lung, and colon cancer.[3] Chemotherapy-induced peripheral neuropathy (CIPN) is a general side effect of taxane- and platinum-based chemotherapy, and is accompanied by signs of sensory and motor impairment.[4] Although CIPN usually manifests as sensory symptoms including numbness and paresthesia in the hands and feet, motor symptoms including lower muscle weakness and muscle cramps are unusual.[5] Many studies have revealed that CIPN symptoms increase the risk of mobility limitations, balance problems, abnormal gait, and fear of falling, and that CIPN increases the prevalence of falls among patients with cancer.[6,7] The 16-item ABC (ABC-16) scale is a reliable and valid questionnaire used to measure balance confidence that is widely utilized in many populations.[8–10] Previous studies have demonstrated that balance confidence questionnaires are more useful than physical performance tests in predicting falls.[11] In addition, poor scores on balance confidence questionnaires have been linked to mobility limitations and falls.[12,13] Although the ABC-16 scale has strong psychometrics for measuring balance confidence in older persons who participate in everyday activities, the reliability of the ABC-16 scale for cancer patients undergoing chemotherapy is unknown. The Thai version of the ABC-16 has excellent internal consistency, excellent reliability (Cronbach's alpha coefficient = 0.96), and moderate convergent validity with respect to the Fall Efficacy Scale (Spearman's rho = 0.66).[14] However, the psychometric properties of the Thai version of the ABC-16 have not been documented among women with cancer undergoing chemotherapy treatment with neurotoxic agents.

The objective of this study was to determine the test–retest reliability and concurrent validity of the Thai version of the ABC-16 scale and a short version of the ABC-16 (ABC-6) among women with cancer undergoing taxane- and/or platinum-based chemotherapy.

Method

Design and setting

This cross-sectional study was performed to test the psychometric properties of the Thai version of the ABC scale in women with cancer undergoing taxane- and/or platinum-based chemotherapy. Women with cancer were recruited at the Chulabhorn Hospital, Thailand, and the National Cancer Institute of Thailand between December 2020 and April 2021.

Participants

Thirty-one women with cancer undergoing taxane- and/or platinum-based chemotherapy participated in this study. The participants received instructions and signed an informed consent form prior to their involvement in the study. The ethics review committees for research involving human subjects of the Chulabhorn Research Institute (under study ID: 047/2563) and the National Cancer Institute of Thailand (under study ID: 002_2021RC_OUT684) approved the study protocol. The eligibility criteria were: (1) age 30–60 years, (2) undergoing taxane- and/or platinum-based chemotherapy, (3) body mass index (BMI) 18.5–24.9 kg/m^2, and (3) able to speak and understand the Thai language. Women with cancer were excluded if they (1) had bone metastasis, (2) had brain metastasis, (3) had a high risk of bleeding, (4) had a history of neurological conditions with peripheral neuropathic signs, (5) had severe hearing problems, or (6) were unable to attend all of the study sessions.

Instruments

Thai version of the Activities-specific Balance Confidence (ABC) scale

The Thai version of the ABC-16 scale is a 16-item questionnaire that collects self-perceived ratings of balance confidence. Each item is scored using a numerical rating scale ranging from 0% to 100%, with 0 indicating no

confidence and 100% indicating complete confidence in performing a given activity.[15] The total ABC-16 score for each participant is determined by summing the individual item scores and then dividing the result by the total number of items. Many studies have demonstrated that the scale has good psychometric properties.[8,11,16] For example, the ABC-16 was found to have excellent test–retest reliability ($r = 0.92$, $p < 0.001$) and internal consistency based on Cronbach's alpha (Cronbach $\alpha = 0.79$) in community-dwelling older adults.[8] In addition, ABC-16 scores were significantly associated with Balance Evaluation System (BESTest), Mini-BESTest, and Brieft-BESTest scores ($r = 0.73$; $p<0.001$, $r = 0.52$; $p<0.01$, and $r = 0.81$; $p<0.001$; respectively) among older cancer survivors.[12] The ABC-6 comprises the six most difficult balancing activities from the original 16-item scale, making it easier to administer and more suitable for use in busy clinical or academic settings.[16] A previous study in older persons with gait abnormalities and Parkinson's disease found substantial correlations between the ABC-16 and the ABC-6, indicating that the ABC-6 may be a valid measure of balance confidence.[17]

The Timed Up and Go test (TUG)

The Timed Up and Go (TUG) test is used to assess functional mobility and the capacity to walk while maintaining one's balance.[18,19] The TUG was conducted using a normal chair (chair seat height 43 cm) and any walking devices routinely used by the participant. The participant was instructed to get up from the chair, walk 3 meters to a line of colored tape on the floor, turn around, walk back to the chair, and sit back down. A stopwatch was started when the participant's buttocks rose off of the seat, and the time was up when their buttocks reconnected with the chair. We conducted 3 TUG trials, and the average times were used for analysis.

The Fullerton Advanced Balance (FAB) Scale

The Fullerton Advanced Balance (FAB) scale is a valid and reliable assessment of balance performance among patients with cancer.[20,21] The FAB is a functional static and dynamic balancing evaluation that consists of 10 performance-based activities performed in a variety of sensory situations. The FAB has a total score of 0–40 points and an item score of 0–4 points, with a higher score indicating better balance.

Procedures

All participants were informed regarding the study objectives and testing procedures prior to participation, and signed informed consent forms. They completed the Thai version of the ABC-16 at two distinct time intervals, separated by a 3-hour delay, to enable test–retest analysis. The ABC-6 score was calculated by taking the mean score of 6 items from the ABC-16, as indicated by Peretz et al. (2006) (questions 5, 6, and 13–16), and given as a percentage of confidence[17]. We examined the concurrent validity of the Thai version of both the ABC-16 and the ABC-6 by calculating the correlation between the total score for the Thai version of the ABC scale, the average times for the TUG, and the total FAB score for tests completed on the same day.

Statistical analysis

The statistical analysis was performed using SPSS Statistics version 23 for Windows (IBM, Armonk, NY, USA). Descriptive data were used to examine the participant characteristics. The Shapiro-Wilk test was used to assess the normality of the data. The intraclass correlation coefficient (ICC) was used to calculate the test–retest reliability (ICC3,1). The ICC values were interpreted as follows: an ICC greater than 0.9 implies excellent reliability, 0.76–0.89 indicates high reliability, 0.51–0 indicates modest reliability, and less than 0.5 indicates poor reliability.[22] We calculated the standard error of measurement (SEM) to ascertain the absolute reliability of the score precision. We used the following formula: SEM= highest standard deviation of all trials × √(1-ICC). We also calculated the minimum detectable change (MDC) to investigate the degree of change between scores that could be considered to represent real change. We calculated the MDC at a 95% confidence interval (MDC 95%) using

the following formula: MDC 95% = 1.96 × SEM × √2. The SEM% and MDC% were calculated using SEM% = (SEM x 100)/mean and MDC% = (MDC x 100)/mean, respectively.[23] The Spearman correlation coefficient between the Thai version of the ABC-16, ABC-6 and the average times of the TUG and total FAB score were used to evaluate concurrent validity. The correlation coefficients were interpreted as follows: values less than 0.3 indicated no validity, 0.31–0.5 indicated low validity, 0.51–0.70 indicated moderate validity, 0.71–0.90 indicated high validity, and more than 0.90 indicated excellent validity.[24] The significance level was set at $p < 0.05$.

Results

Participant demographic characteristics

All of the participants were female (n=31). The mean age was 51.87±6.17 and the mean BMI was 21.97±1.71. The mean TUG was 7.73±1.11 and the mean FAB was 36.16±2.10. Among the participants, 80.60% had breast cancer and 19.40% had gynecologic cancer. Paclitaxel was administered to the majority of the participants (61.30%), with an equal proportion receiving docetaxel and paclitaxel plus carboplatin (19.40%). More than half of the participants had received ≤ 4 cycles of taxane-based chemotherapy.

Test–retest reliability of the Thai version of the ABC-16 scale

The test–retest reliability (ICC), SEM, and MDC of the Thai version of the ABC-16 scale are presented in Table 1. The test–retest reliability of the total ABC-16 scale ICC was 0.99, indicating excellent reliability (SEM= 1.16; MDC = 3.26). The test–retest reliability of the total ABC-6 scale ICC was 0.96, indicating excellent reliability (SEM= 2.67; MDC = 7.51). For each item of the Thai version of the ABC-16 scale, the ICC values ranged from 0.86–0.98, indicating high to excellent reliability (SEM= 1.04–5.46; MDC = 2.92–15.34). Concurrent validity of the Thai version of the ABC-16 and ABC-6 scale

The Thai version of the ABC-16 had low validity with respect to the TUG ($r = -0.41$, $p < 0.05$), while the ABC-6 scale had moderate validity with respect to the TUG ($r = -0.51$, $p < 0.01$). The concurrent validity between the Thai version of the ABC-16 and ABC-6 scales and the FAB was not statistically significant ($p > 0.05$).

Discussion

This study investigated the reliability and validity of the ABC scale (Thai version) among women with cancer who were undergoing neurotoxic chemotherapy. The test–retest reliability of the total scale for both the ABC-16 and ABC-6 scales was excellent. Although we found a substantial correlation between the concurrent validity of the Thai versions of the ABC-16 and ABC-6 scales and the TUG, this was not found to be statistically significant with FAB.

The present study was the first to test the reliability and validity of the Thai version of the ABC-16 in women with cancer who were undergoing neurotoxic chemotherapy. The test–retest reliability of both the total scale and each item on the Thai version of the ABC-16 was high to excellent. These results are in agreement with those of Schepens et al. (2010), who evaluated the test–retest reliability of the ABC-16 and ABC-6 among older adults. The participants completed the questionnaire twice over a 30-day period. The results showed high test–retest reliability based on the ICC (ICC = 0.76 and ICC = 0.82 for the ABC-16 and ABC-6, respectively).[16] In addition, these results are similar to those of a recent study that examined the psychometric properties of the ABC-16 among older patients with breast cancer.[25] The results indicated good test–retest reliability for tests 2 weeks apart. Moreover, other language versions of the ABC-16, i.e., the Japanese, Brazilian, and Swedish versions, had high to excellent reliability (ICC = 0.92, ICC = 0.95, and ICC = 0.82, respectively).[26–28] Our data indicate that the SEM and MDC for the total scale of the Thai version of the ABC-16 are small (SEM= 1.16, MDC = 3.26). However, the range of the SEM and MDC among each item of the Thai version of the ABC-16 was high, especially for item 1 (SEM= 5.46, MDC = 15.34). These findings imply that the total ABC-16 score has high absolute

reliability, with minor error, for detecting true changes in balance confidence for the performance of daily activities in cancer patients receiving neurotoxic chemotherapy. However, the items of the Thai version of the ABC-16 could not be used individually to define balance confidence.

In the present study, we found a small negative correlation between the Thai version of the ABC-16 and TUG scores, and a moderate negative correlation between the ABC-6 and TUG scores. This is consistent with previous studies that found a correlation between ABC-16, ABC-6 and TUG scores.[10,26,28] Ishige et al. (2020) evaluated the reliability and validity of the Japanese version of the ABC-16 (ABC-J) among community-dwelling stroke survivors. They found a significant correlation (r = −0.55) between ABC-J and TUG scores.[26] Furthermore, Forsberg and Nilsagard (2013) evaluated the reliability and validity of the Swedish version of the ABC-16 among chronic stroke patients. They found a significant correlation (r = −0.48) between ABC-16 and TUG scores.[28] Huang et al. (2016) examined the relationship between ABC-6 and TUG scores among older people with cancer. Their results showed a moderate correlation between ABC-6 and TUG scores (r = −0.54, p <0.05).[10] Although the results of the present study suggest that a higher balance confidence, as measured by the ABC-16 and ABC-6, is connected with enhanced mobility and the ability to walk while maintaining balance, the ABC scale and TUG measure balance according to different aspects of balance and mobility. Accordingly, the ABC and TUG should be combined to comprehensively examine deficiencies underlying mobility limits.

The present study showed that the ABC-16 and ABC-6 scales had excellent reliability, which was consistent with previous studies.[16,17] Peretz et al. (2006) investigated the reliability and validity of the ABC-6 scale among older adults. Their results suggested that the ABC-6 scale was a reliable assessment of balance confidence (Cronbach's alpha 0.81–0.91).[17] Schepens et al. (2010) also found the ABC-6 scale to have high reliability (ICC = 0.82).[16] Thus, both the ABC-6 and ABC-16 appear to be valuable as part of an overall assessment of balancing confidence. This finding implies that a shorter version of the ABC scale (ABC-6 scale) could be used to quickly measure balance confidence for activities in daily life.

In the present study, we did not find a correlation between the Thai versions of the ABC-16, ABC-6 and the FAB among women with cancer receiving neurotoxic chemotherapy. Although the Thai versions of the ABC scale and the FAB are both used to assess balance problem, they achieve this in different ways.[10,20] The ABC scale is a psychology-based assessment of balance confidence that includes questions about balance perception such as "How confident are you that you will not lose your balance or become unsteady when you walk up or down stairs?," "How confident are you that you will not lose your balance or become unsteady when you reach for a small can off a shelf at eye level?," and "How confident are you that you will not lose your balance or become unsteady when you are bumped into by people as you walk through the mall?" The FAB, in contrast, is a physical performance-based assessment of balance that covers aspects of postural control such as musculoskeletal components, sensory strategies, anticipatory mechanisms, and neuromuscular synergies, and includes tasks such as stepping up onto and over a 6-inch bench, reaching forward to retrieve an object (pencil) held at shoulder height with an outstretched arm, and tasks that test reactive postural control.[29] Thus, the ABC and FAB scales evaluate balance in different ways, and so the results derived from the two instruments cannot be directly compared.

This study had several limitations. We only measured the reliability and validity of the scale for women with cancer who had received neurotoxic chemotherapy and had been diagnosed with homogeneous cancer including breast and gynecologic cancer (most had received taxane-based chemotherapy). Thus, further studies with patients with various types of cancer and chemotherapy agents should be conducted.

Conclusion

Our findings indicate that the Thai version of the ABC-16 scale is reliable and valid for assessing balance confidence in women with cancer receiving neurotoxic chemotherapy agents. These findings suggest that screening balance confidence may be required to detect the risk of balance problems and falls in patients receiving neurotoxic chemotherapy and to provide appropriate rehabilitation programs, especially for patients with CIPN symptoms. Furthermore, in busy clinical or research settings requiring rapid, valid, and reliable evaluations of balance confidence, as well as balance impairment screening and fall risk assessments, the ABC-6 may be as useful as the ABC-16 scale.

Figures and Tables

Table 1. Test–retest reliability of the Thai version of the ABC scale in women with cancer

ABC Scale	Scale Score (Mean±SD)		ICC (95% CI)	SEm	MDC
	Time 1	Time 2			
Total ABC-16 score	86.74±10.59	86.80±10.54	0.99 (0.97–0.98)	1.16	3.26
Total ABC-6 score	80.70±13.94	81.30±12.76	0.96 (0.92–0.99)	2.67	7.51
ABC1	92.58±10.64	94.84±9.26	0.87 (0.74–0.94)	5.46	15.34
ABC2	83.87±16.47	85.81±15.44	0.94 (0.88–0.97)	3.92	11.02
ABC3	87.90±13.89	88.55±12.19	0.93 (0.85–0.97)	3.46	9.72
ABC4	88.71±14.32	89.03±12.48	0.93 (0.85–0.96)	3.55	9.98
ABC5	86.45±12.79	83.87±13.58	0.86 (0.71–0.93)	1.85	5.20
ABC6	77.10±17.74	80.39±16.87	0.94 (0.87–0.97)	1.04	2.92
ABC7	93.23±9.79	93.22±9.45	0.92 (0.84–0.96)	2.72	7.64
ABC8	93.87±9.19	93.55±9.85	0.95 (0.90–0.98)	2.13	5.99
ABC9	91.44±10.46	93.23±10.77	0.93 (0.84–0.96)	2.81	7.90
ABC10	91.94±10.14	92.42±10.87	0.93 (0.85–0.96)	2.78	7.81
ABC11	85.48±14.34	85.00±13.96	0.87 (0.73–0.94)	5.10	14.33
ABC12	88.71±13.84	85.48±15.02	0.91 (0.81–0.96)	4.33	12.17
ABC13	81.94±14.93	82.26±13.59	0.92 (0.83–0.96)	4.04	11.35
ABC14	87.74±13.09	88.06±12.50	0.97 (0.95–0.99)	2.18	6.13
ABC15	78.71±13.60	77.74±15.00	0.91 (0.81–0.96)	4.30	12.08
ABC16	77.33±19.42	75.33±20.30	0.98 (0.95–0.99)	2.81	7.90

ABC, Activities-specific Balance Confidence; ICC, Intraclass Correlation Coefficient; SEm, Standard error measurement; MDC, minimal detectable change.

Table 2. Pearson correlation coefficients (r) between the ABC-16, ABC-6, and clinically feasible measures of balance

Balance measures	ABC-16	p-value	ABC-6	p-value
TUG	–0.41	≤ 0.05*	–0.51	≤ 0.01*
FAB	0.23	0.22	0.25	0.17

ABC-16, Activities-specific Balance Confidence; ABC-6, short version of the ABC-16; TUG, Time Up and Go test; FAB, Fullerton Advanced Balance Scale; *, p-value < 0.05.

Table 3. Details of psychometric properties of the ABC-16, ABC-6

Author	Properties	Types	ABC-16	ABC-6
Current study	Reliability	Test-retest	ICC=0.99	ICC=0.96
			(SEM=1.16; MDC=3.26)	(SEM=2.67; MDC=7.51)
	Validity	Concurrent	TUG (r =−0.41, p <0.05)	TUG (r = −0.51, p <0.01)
			FAB (r =0.23, p <0.22)	FAB (r =0.25, p <0.17)
Schepens et al.	Reliability	Test-retest	ICC=0.76	ICC=0.82
	Validity	Concurrent	TUG (r = −0.69, p ≤ 0.001)	TUG (r = −0.65, p ≤ 0.001)
Blackwood & Rybicki.	Reliability	Test-retest	ICC=0.85	ICC=0.78
			(SEM=5.92)	(SEM=9.39)
	Validity	Convergent	TUG (r = −0.60, p < .01)	TUG (r = −0.60, p < .01)
Ishige et al.	Reliability	Test-retest	ICC=0.92	-
			(SEM=7.14; MDC=19.79)	
	Validity	Concurrent	TUG (r = −0.55, p < .001)	-
Freitas et al.	Reliability	Intra-rater	α =0.95	α =0.95
		Inter-rater	α =0.95	α =0.93
	Validity	Construct	BBS (r=0.65, p < .001)	BBS (r=0.63, p < .001)
Forsberg & Nilsagård.	Reliability	Test-retest	ICC=0.82	-
	Validity	Convergent	TUG (r = −0.48, p < .001)	-
Huang et al.	Validity	Concurrent	-	TUG (r = −0.54, p < .001)

ABC-16, Activities-specific Balance Confidence; ABC-6, short version of the ABC-16; ICC, the intraclass correlation coefficient; SEM, the standard error of measurement; MDC, the minimum detectable change; TUG, Time Up and Go test; FAB, Fullerton Advanced Balance Scale; BBS, Berg Balance Scale; α, The Krippendorff's alpha; *, p-value < 0.05.

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References

1. Mattiuzzi C, Lippi G. Current Cancer Epidemi-ology. *J Epidemiol Glob Health.* 2019; 9(4):217-222.doi:10.2991/jegh.k.191008.001
2. Chabner BA, Roberts TG. Timeline: Chemotherapy and the war on cancer. *Nat Rev Cancer.* 2005;5(1):65-72. doi:10.1038/nrc1529
3. Mikuła-Pietrasik J, Witucka A, Pakuła M, et al. Comprehensive review on how platinum- and taxane-based chemotherapy of ovarian cancer affects biology of normal cells. *Cell Mol Life Sci CMLS.* 2019;76(4):681-697. doi:10.1007/s00018-018-2954-1
4. Eckhoff L, Knoop A, Jensen MB, Ewertz M. Persistence of docetaxel-induced neuropathy and impact on quality of life among breast cancer survivors. *Eur J Cancer.* 2015;51(3): 292-300. doi:10.1016/j.ejca.2014.11.024
5. Velasco R, Bruna J. Taxane-Induced Peripheral Neurotoxicity. *Toxics*. 2015;3(2):152-169. Published 2015 Apr 28. doi:10.3390/toxics 3020152
6. Kang GE, Murphy TK, Kunik ME, et al. The detrimental association between fear of falling and motor performance in older cancer patients with chemotherapy-induced peripheral neuropathy. *Gait Posture.* 2021; 88:161-166.doi:10.1016/j.gaitpost.2021.05.022
7. Rattanakrong N, Promma N, Saraboon C, Waongenngarm P. Physical impairments, sensory disturbance, and functional ability in a cancer patient with and without chemotherapy-induced peripheral neuropathy symptoms. *Support Care Cancer.* 2022; 30(6):5055-5062.doi:10.1007/s00520-022-06927-5
8. Powell LE, Myers AM. The Activities-specific Balance Confidence (ABC) Scale. *J Gerontol A Biol Sci Med Sci.* 1995;50A(1):M28-M34. doi:10.1093/gerona/50a.1.m28
9. Rolenz E, Reneker JC. Validity of the 8-Foot Up and Go, Timed Up and Go, and Activities-Specific Balance Confidence Scale in older adults with and without cognitive impairment. *J Rehabil Res Dev.* 2016;53(4): 511-518. doi:10.1682/JRRD.2015.03.0042
10. Huang MH, Righter A, Shilling T. Self-reported Balance Confidence Relates to Perceived Mobility Limitations in Older Cancer Survivors. *Rehabilitation Oncology.* 2016;34:64-71.
11. Landers MR, Oscar S, Sasaoka J, Vaughn K. Balance Confidence and Fear of Falling Avoidance Behavior Are Most Predictive of Falling in Older Adults: Prospective Analysis. *Phys Ther.* 2016;96(4):433-442. doi:10.2522/ptj.20150184
12. Huang MH, Miller K, Smith K, Fredrickson K, Shilling T. Reliability, Validity, and Minimal Detectable Change of Balance Evaluation Systems Test and Its Short Versions in Older Cancer Survivors: A Pilot Study. *J Geriatr Phys Ther.* 2016;39(2):58-63. doi:10.1519/JPT.0000000000000047
13. Lajoie Y, Gallagher SP. Predicting falls within the elderly community: comparison of postural sway, reaction time, the Berg balance scale and the Activities-specific Balance Confidence (ABC) scale for comparing fallers and non-fallers. *Arch Gerontol Geriatr.* 2004;38(1):11-26.doi:10.1016/s0167-4943(03)00082-7
14. Nanthapaiboon K, Wannapakhe J, Viriyatarakij N, Boonsinsukh R. Assessment of Internal Consistency and Convergent Validity of the Activities-specific Balance Confidence (ABC) Scale Thai Version. *Thai Pharmaceutical and Health Science Journal - วารสารไทยเภสัชศาสตร์และวิทยาการสุขภาพ.* 2018;13(1):1-7.
15. Myers AM, Powell LE, Maki BE, Holliday PJ, Brawley LR, Sherk W. Psychological indicators of balance confidence: relationship to actual and perceived abilities. *J Gerontol A Biol Sci Med Sci.* 1996;51(1):M37-M43. doi:10.1093/gerona/51a.1.m37
16. Schepens S, Goldberg A, Wallace M. The short version of the Activities-specific Balance Confidence (ABC) scale: its validity, reliability, and relationship to balance

impairment and falls in older adults. *Arch Gerontol Geriatr.* 2010;51(1):9-12. doi: 10.1016/j.archger. 2009.06.003
17. Peretz C, Herman T, Hausdorff JM, Giladi N. Assessing fear of falling: Can a short version of the Activities-specific Balance Confidence scale be useful?. *Mov Disord.* 2006;21(12):2101-2105.doi:10.1002/mds. 21113
18. Overcash JA, Rivera HR. Physical performance evaluation of older cancer patients: a preliminary study. *Crit Rev Oncol Hematol.* 2008;68(3):233-241.doi:10.1016/j.critrevonc. 2008.07.001
19. Christopher A, Kraft E, Olenick H, Kiesling R, Doty A. The reliability and validity of the Timed Up and Go as a clinical tool in individuals with and without disabilities across a lifespan: a systematic review. *Disabil Rehabil.* 2021;43(13):1799-1813. doi:10.1080/ 09638288.2019.1682066
20. Wampler MA, Topp KS, Miaskowski C, Byl NN, Rugo HS, Hamel K. Quantitative and clinical description of postural instability in women with breast cancer treated with taxane chemotherapy. *Arch Phys Med Rehabil.* 2007;88(8):1002-1008.doi:10.1016/j.apmr. 2007.05.007
21. Wampler MA, Miaskowski C, Hamel K. The modified Total Neuropathy Score: a clinically feasible and valid measure of taxane-induced peripheral neuropathy in women with breast cancer. *J Support Oncol.* 2006;4:9-16.
22. Koo TK, Li MY. A guideline of selecting and reporting intraclass correlation coefficients for reliability research. *J Chiropr Med.* 2016; 15(2):155-163.doi:10.1016/j.jcm. 2016.02.012
23. Huang SL, Hsieh CL, Wu RM, Tai CH, Lin CH, Lu WS. Minimal detectable change of the timed “up & go” test and the dynamic gait index in people with Parkinson disease [published correction appears in Phys Ther. 2014 Jul;94(7):1056]. *Phys Ther.* 2011;91(1):114-121.doi:10.2522/ptj. 20090126
24. Mukaka MM. Statistics corner: A guide to appropriate use of correlation coefficient in medical research. *Malawi Med J.* 2012;24(3):69-71.
25. Blackwood J, Rybicki K. Balance Confidence and Falls Self-Efficacy in Older Breast Cancer Survivors. *Rehabil Nurs.* 2021;46(3):146-154. doi:10.1097/rnj.0000000000000316
26. Ishige S, Wakui S, Miyazawa Y, Naito H. Reliability and validity of the Activities-specific Balance Confidence scale-Japanese (ABC-J) in community-dwelling stroke survivors. *Phys Ther Res.* 2019;23(1):15-22. Published 2019 Oct 10. doi:10.1298/ptr.E9982
27. Freitas RM, Ribeiro KF, Barbosa JS, Gomes CDS, Deshpande N, Guerra RO. Validity and reliability of the Brazilian activities-specific balance confidence scale and determinants of balance confidence in community-dwelling older adults. *Physiother Theory Pract.* 2022;38(2):345-354. doi:10.1080/09593985 .2020.1747122
28. Forsberg A, Nilsagård Y. Validity and Reliability of the Swedish Version of the Activities-specific Balance Confidence Scale in People with Chronic Stroke. *Physiother Can.* 2013;65(2):141-147. doi:10.3138/ptc. 2011-54
29. Shumway-Cook A, Woollacott MH. *Motor Control: Translating Research into Clinical Practice.* 5th, illustrated ed. Wolters Kluwer; 2016. doi:10.2991/jegh.k.191008.001

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