



# Six Minute Walk Test as A Measurement Tool for Functional Capacity

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Various scientific articles which include scientific writing, books or journals have been known to provide evidence based scientific facts. Thus, in order to achieve accurate evidence based results, a clear outcome measurement is required. Besides, the measurement should be based on precise measurements, both in methods and tools utilized during the measurement. This is a very essential matter, as the accuracy of an outcome measurement would correlate to intervention, program and prognosis of an individual.

Six Minute Walk Test (6MWT) had been known as a tool commonly used to assess functional capacity of individuals in the medical rehabilitation field. The 6MWT then measures a distance in which an individual could walk under a duration of 6 minutes. The final distance travelled from the examination could then be compared to a predicted walking distance as a reference value. American Thoracic Society (ATS) recommended that each country/ethnicity to have their own reference values, and thus ATS had never given a universal baseline total distance prediction in the 6MWT manual.<sup>1</sup>

Predicted walking distance was initially formulated by Paul Enright, and it was done with the Caucasian race. The predictive equation could be derived through a linear regression with walk distance as a dependent variable, and several other anthropometric values as independent variables. Some of these anthropometric values include body height, age and body weight.<sup>2</sup>

Anthropometric differences could then affect walk distance of an individual. Several studies mentioned that there was correlation between body height and step length. The same 6 minutes would result in various walk distances in individuals of varying body height.<sup>3,4</sup> This situation will eventually lead to inaccurate measurements if the predictive equation does not adjust to the local anthropometric values.

Iwama et al (2009) had compared the predicted walk distance equation of 134 healthy Brazilians with four other Caucasian based equations. They had obtained an overestimated predicted walk distance with all four equations as compared to the normal average walk distance of Brazilians.<sup>5</sup>

The same occurrence was also found in Nury Nusdwiningtyas *et al* (2014) as they compared the predicted walk distance of 123 healthy Indonesians (Mongoloid race) with two Caucasian based equation (Enright and

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The table below shows comparison and correlations between measured and predicted 6 minute walk distance of Brazilians as compared to other studies' equation.<sup>5</sup>

Equation	n	Measured 6 MWD (m)	Predicted 6MWD (m)	Delta (m)	% predicted	Correlation (r)
Gibbons et al	122	657 (512-645)	716 (665-773)*	137 ± 74	80 ± 10	0.50 <sup>+</sup>
Chetta et al	104	581 (526-648)	624 (594-657)*	32 ± 71	94 ± 11	0.48 <sup>+</sup>
Trooters et al	31	534 (482-621)	600 (570-663)*	71 ± 76	88 (81-93)	0.47 <sup>#</sup>
Camari et al	22	536 (480-630)	553 (634-702)*	115 ± 67	82 ± 10	0.55 <sup>#</sup>

Data are repoted as median (interquartile range). 6MWD=6-min walk distance. \*P0.01: measured vs predicted 6 MWD; <sup>+</sup>p<0.001; significant correlation; <sup>#</sup>p<0.05: significant correlation.

Sherril). Enright’s formula had also shown a larger estimation as compared to Nury’s formula (p<0,05).<sup>6</sup>

In that study it was found that the walk distance achieved with 6MWT (547,45 ± 54.24 meters) was well suited to Nury’s predicted walk distance formula (547,53 ± 32,84 meters).<sup>6</sup> Conversely, predicted walk distance with Enright and Sherill’s formula had yielded 683,90 ± 54,17 meters. These differences then had provided a statistically significant difference with p<0,001.<sup>2</sup> Additionally, the same instance was also found in other population such as Australians, Tunisians, Singaporeans, and others.

In conclusion, 6MWD present great variability in healthy individual. Anthropometric and demographic features plays important role as a part of this variability. The equation that developed for Indonesian (Mongoloid) are probably the most appropriate value to intepretate the performance of chronic disease. Futhermore, it can affect their functional capacity to perform activity. However, it is strongly recommended that such equation be validated in other region of Indonesia.

## References

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