

# Sedentary Behavior among Male and Female Older Adults

(Demographic and gender study in West Java)

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**Abstract**—The purpose of this review is to describe sedentary behavior differences among male and female older adults. The studies reviewed were limited to 277 older adults (> 60 years old) who are willing to be interviewed and fill in the International Physical Activity Questionnaire (IPAQ) short form Indonesian version. From the IPAQ data, the only average sitting time spent in one day is processed. The result show there was differences between male and female adults on sedentary behavior ( $p=.000$ ). Female older adult reported an average of more sedentary behavior than male. These findings require further in-depth study.

**Keywords**—sedentary behavior; older adults; physical inactivity; physical activity

## I. INTRODUCTION

As it is known that physical activity (PA) is related to health factors [1,2] and the lack of PA will be related to various cardiovascular diseases (heart, stroke, diabetes etc.) which result in many deaths [3–9]. Besides PA, sedentary behavior is also associated with an increased risk chronic disease [8,10–12].

Sedentary behavior (watching tv, playing gadget etc.) is becoming a phenomenon in modern society everywhere [10], and it happened in children and adults. Watching TV for too long is closely related to the increased risk of type 2 diabetes, cardiovascular disease and all causes of death [13].

Research on sedentary behavior has been carried out in several countries both in the population of children and adolescents [9,14–19], and adults [20–25]. In Canada it was reported that children and adolescents spent 8.6 hours or 62% sedentary in one day [26]. The same trend also occurred in the US, where children and adolescents reportedly spent 6–8 hours a day sedentary behavior [27,28]. While objective measurement results in adults are known that more than 67% spend a sedentary time of more than 8.5 hours in one working day [20].

Research on SB in Indonesia today is still relatively rare, especially in adults. Differences in culture and geographical location allow similar studies not to be the same as those done in several countries as stated above.

It is assessed from the demographic aspect that urban adults are more likely to walk or use bicycles compared to rural adults [29]. As for adult women in rural areas more sedentary than women in urban areas [30]. The difference in culture between Indonesia which still holds strong customs, allows for differences in sedentary behavior conditions both demographically and gender. Therefore, this study tries to reveal that sedentary behavior in adults > 60 years is assessed by demographic (rural and urban) and gender.

## II. METHODS

### A. Participants and Procedures

Participants in this study were 277 adults (aged > 60 years) in West Java, Indonesia. 153 participants came from urban areas (male = 71 and female = 82) and 124 participants came from rural areas (male = 64 and female = 60). Respondents were volunteers who were asked to tell about the average time spent in their daily activities.

Participants were asked to remember and report on how long on average they sat in one working day (watching TV, working, playing cellphone, etc.) in the past week. When filling out the questionnaire, the respondent was accompanied by data collectors to avoid mistakes in filling.

### B. Data Analysis

The data description presents the mean and overall standard deviation based on demographic and gender location, and based on rural and urban gender. To determine SB differences based between rural-urban area and gender used test between of subject effect. To examine SB differences by gender based on demographics used t-test statistics (independent sample t-test) at the 0.05 significance level.

## III. RESULTS

Descriptive data in table 1 shows that overall the average adult woman in West Java spends almost 9 hours a day sitting, while men are almost 8 hours in one work day. Overall, adults in urban areas spend an average of 9 hours a day sitting, while in rural areas spend an average of 7 hours a day.

TABLE I. MEAN AND SD OF SEDENTARY BEHAVIOR

Gender	Living Area	Mean	SD	N
Male	Urban	8.8003	1.57738	71
	Rural	6.9973	.02125	64
	Total	7.9456	1.45482	135
Female	Urban	10.2622	2.73974	82
	Rural	7.0195	.19415	60
	Total	8.8920	2.62901	142
Total	Urban	9.5838	2.38346	153
	Rural	7.0081	.13578	124
	Total	8.4308	2.18705	277

Overall there was a significant difference in average sedentary time between rural and urban adults ( $p = .000$ ) (table 2). Adults in urban areas spend more time behaving sedentary in one workday compared to adults in the rural area. While based on the test results showed that overall there were significant differences in sedentary behavior between male and female adult ( $p = .000$ ) (table 2). Female adult spends more time sitting (sedentary behavior) than male.

TABLE II. TEST OF BETWEEN SUBJECT EFFECTS

Source	df	F	Sig.
Corrected Model	3	62.150	.000
Intercept	1	6501.906	.000
Gender	1	13.087	.000
Living	1	151.272	.000
Gender * Living	1	12.317	.001
Error	273		
Total	277		
Corrected Total	276		

Table 3 shows that there are significant sedentary time differences between rural and urban adult women ( $p .000$ ). Adult women in urban areas spend more time sitting than adult women in rural areas. Likewise, in adult men there are significant sedentary time differences between rural and urban adult men ( $p .000$ ). Urban male spends more time sitting than adult women in the rural areas. There is a significant interaction between demographic and gender towards sedentary behavior.

TABLE III. SB DIFFERENCES BASED ON DEMOGRAPHIC

	t	Df	Sig. (2-tailed)	Mean Dif
Male	9.140	133	.000	1.80
Female	9.142	140	.000	3.24

The results of these studies indicate that urban adults in West Java are more sedentary than rural ones. A work culture in urban areas that spends more time sitting in front of a computer or notebook, using a car or motorcycle and dealing with cellphones is one of the predictors of high sedentary behavior of adults in West Java. While in rural areas, adults > 60 years of age who are still active as farmers are one of the assumptions as to why they are relatively more active compared to urban areas. This condition occurs in both male and female.

As previous research reports that adults > 60 years spend time sitting 4 hours a day and the results of measurements objectively prove that behavior stays more than 8.5 hours a day [20]. Adults in rural areas are more physically active than adults in urban areas [29]. The two studies are at least in line with the results of this study.

#### IV. CONCLUSION

The results of this study concluded that, overall there were significant differences between adults aged 60 years and over who lived in rural and urban areas. In addition, there are also significant differences in sedentary behavior between adults in urban and rural areas for both men and women.

#### REFERENCES

- [1] D.E.R. Warburton, C.W. Nicol, S.S.D. Bredin, Health benefits of physical activity: the evidence. *C Can Med Assoc J* [Internet]. 2006;174(6):801–9.
- [2] W.J. Chodzko-Zajko, D.N. Proctor, M.A. Fiatarone Singh, C.T. Minson, C.R. Nigg, G.J. Salem, et al. Exercise and Physical Activity for Older Adults. *Am Coll Sport Med*. 2009;11(16):1510–30.
- [3] S. Apabhai, G.S. Gorman, L. Sutton, J.L. Elson, T. Plotz, D.M. Turnbull, et al. Habitual Physical Activity in Mitochondrial Disease. *PLoS Med*. 2011;06(7):1–5.
- [4] J.D. Berg, Van Der, C.D.A. Stehouwer, H. Bosma, M.T. Schram, S.J.S. Sep, C.J.H. Kallen, Van Der, et al. Associations of total amount and patterns of sedentary behaviour with type 2 diabetes and the metabolic syndrome : The Maastricht Study. *Diabetologia*. 2016;(59):709–18.
- [5] A. Berzigotti, U. Saran, J.F. Dufour, Physical activity and liver diseases. *Hepatology* [Internet]. 2016;63(3):1026–40.
- [6] I.M. Lee, E.J. Shiroma, F. Lobelo, P. Puska, S.N. Blair, P.T. Katzmarzyk, Impact of Physical Inactivity on the World's Major Non-Communicable Diseases. *Lancet*. 2012;380(9838):219–29.
- [7] E.J. Shiroma, I.M. Lee, Physical Activity and Cardiovascular Health: Lessons Learned From Epidemiological Studies Across Age, Gender, and Race/Ethnicity. *Circulation* [Internet]. 2010;122(7):743–52.
- [8] E.G. Wilmoth, C.L. Edwardson, F.A. Achana, M.J. Davies, T. Gorely, L.J. Gray, et al., Sedentary time in adults and the association with diabetes, cardiovascular disease and death: Systematic review and meta-analysis. *Diabetologia*. 2012;55(11):2895–905.
- [9] T.J. Saunders, J. Chaput, M.S. Tremblay, Sedentary Behaviour as an Emerging Risk Factor for Cardiometabolic Diseases in Children and Youth. *Can J Diabetes* [Internet]. 2014;38(1):53–61.
- [10] B.M. Lynch, Sedentary behavior and cancer: A systematic review of the literature and proposed biological mechanisms. *Cancer Epidemiol Biomarkers Prev*. 2010;19(11):2691–709.
- [11] A.A. Thorp, N. Owen, M. Neuhaus, D.W. Dunstan, Sedentary behaviors and subsequent health outcomes in adults: A systematic review of longitudinal studies, 1996–2011. *Am J Prev Med* [Internet]. 2011;41(2):207–15.
- [12] G.N. Healy, C.E. Matthews, D.W. Dunstan, E.A.H. Winkler, N. Owen, Sedentary time and cardio-metabolic biomarkers in US adults: NHANES 200306. *Eur Heart J*. 2011;32(5):590–7.
- [13] A. Grøntved, F.B. Hu, Television Viewing and Risk of Type 2 Diabetes, Cardiovascular Disease, and All-Cause Mortality: A Meta-analysis. *Am Med Assoc*. 2011;305(23):2448–55.
- [14] P.S. Tandon, C. Zhou, J.F. Sallis, K.L. Cain, L.D. Frank, B.E. Saelens, et al. Home environment relationships with children's physical activity, sedentary time, and screen time by socioeconomic status. *Int J Behav Nutr Phys Act* [Internet]. 2012;9(1):88.
- [15] V. Carson, S. Hunter, N. Kuzik, C.E. Gray, V.J. Poitras, J.P. Chaput, et al. Systematic review of sedentary behaviour and health indicators in

- school-aged children and youth: an update <sup>1</sup>. *Appl Physiol Nutr Metab* [Internet]. 2016;41(6 (Suppl. 3)):S240–65.
- [16] E. Bathrellou, C. Lazarou, D.B. Panagiotakos, L.S. Sidossis, Physical activity patterns and sedentary behaviors of children from urban and rural areas of Cyprus. *Eur J Public Heal*. 2007;15(2):66–70.
- [17] A.G. LeBlanc, J.C. Spence, V. Carson, S.C. Gorber, C. Dillman, I. Janssen, et al., Systematic review of sedentary behaviour and health indicators in the early years (aged 0–4 years). *Appl Physiol Nutr Metab* [Internet]. 2012;37(4):753–72.
- [18] J. Buckworth, C. Nigg, Physical activity, exercise, and sedentary behavior in college students. *J Am Coll Health*. 2004.
- [19] M. Schneider, G.F. Dunton, D.M. Cooper, Physical activity and physical self-concept among sedentary adolescent females: An intervention study. *Psychol Sport Exerc*. 2008;9(1):1–14.
- [20] J. Harvey, S. Chastin, D. Skelton, Prevalence of Sedentary Behavior in Older Adults: A Systematic Review. *Int J Environ Res Public Health* [Internet]. 2013;10(12):6645–61.
- [21] P.W. Ku, K.R. Fox, L.J. Chen, P. Chou, Physical activity, sedentary time and subjective well-being in Taiwanese older adults. *Int J Sport Psychol* [Internet]. 2011;42(3):245–62.
- [22] A. Allafi, A.R. Al-Haifi, M.A. Al-Fayez, B.I. Al-Athari, F.A. Al-Ajmi, H.M. Al-Hazzaa, et al. Physical activity, sedentary behaviours and dietary habits among Kuwaiti adolescents: Gender differences. *Public Health Nutr*. 2014;17(9):2045–52.
- [23] J.D. Van Der Berg, H. Bosma, P. Caserotti, G. Eiriksdottir, N.Y. Arnardottir, K.R. Martin, et al. Midlife determinants associated with sedentary behavior in old age. *Med Sci Sports Exerc*. 2014;46(7):1359–65.
- [24] N.Y. Arnardottir, A. Koster, D.V. Domelen, R.J. Brychta, P. Caserotti, G. Eiriksdottir, et al. Objective measurements of daily physical activity patterns and sedentary behaviour in older adults: Age, Gene/Environment Susceptibility-Reykjavik Study. *Age Ageing*. 2013;42(2):222–9.
- [25] J.a. Harvey, S.F.M. Chastin, D.a. Skelton, How Sedentary are Older People? A Systematic Review of the Amount of Sedentary Behavior. *J Aging Phys Act*. 2015;23(3):471–87.
- [26] J.M. Ramos, M. de Górgolas, J. Cuadros, E. Malmierca, Physical activity of Canadian children and youth: Accelerometer results from the 2007 to 2009 Canadian Health Measures Survey. *Compon Stat Canada Cat no 82-003-X Heal Reports* [Internet]. 2011;22(1):295–304. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/22425145>
- [27] C.E. Matthews, K.Y. Chen, P.S. Freedson, M.S. Buchowski, M. Beech, R.R. Pate, et al. Amount of Time Spent in Sedentary Behaviors in the United States, 2003-2004. *Am J Epidemiol*. 2008;167(7):875–81.
- [28] M.C. Whitt-Glover, W.C. Taylor, M.F. Floyd, M.M. Yore, A.K. Yancey, C.E. Matthews, Disparities in physical activity and sedentary behaviors among US children and adolescents: Prevalence, correlates, and intervention implications. *J Public Health Policy*. 2009;30(SUPPL. 1):309–34.
- [29] D.V. Dyck, G. Cardon, B. Deforche, I.D. Bourdeaudhuij, Urban-rural differences in physical activity in belgian adults and the importance of psychosocial factors. *J Urban Heal*. 2011;88(1):154–67.
- [30] S. Wilcox, C. Castro, A.C. King, R.C.B. Housemann, Determinants of leisure time physical activity in rural compared with urban older and ethnically diverse women in the United States. *Community Health* 2000;54:667–672, 54, 667–672. 2000; 667–72.