



ORIGINAL ARTICLE



Correlation of physical activities and life quality in elderly

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Abstract

This article considers the correlation between life quality and physical activities in the elderly. The author, using Scopus database search, Clarivate Analytics, and Google Scholar, identified 10 studies that met the criteria for this study, with a total number of participants ($n = 2466$). This study uses Microsoft Excel and SPSS 20.0 software to analyze consider affect level weighted average of life quality and physical activities. Aim to achieve life quality and physical activities of the elderly (over 65 years old). The primary outcome of this study that determined effect in 10 studies was 0.256 (Fisher's $Z = 4,739$, with reliability $p < 0.001$), which confirms that participation in physical activities has a positive effect on life quality in the elderly. At the same time, this paper analyzes heterogeneousness among studies, with Q value ($Q = 75.142$, reliability $p < 0.001$) and I -squared value (82,231), which confirms that studies are inconsistent. Consistency, and also evaluated the publication bias, to demonstrate that there could be no publication bias, the study created a symmetric funnel plot to compare them.

Keywords: Physical activities , Elderly, Physical health, Life quality.

Introduction

The population over 65 years old, worldwide has increased a lot in the past decades, life quality is of prime importance in the medical field. At the same time, the

correlation between life quality and physical activities of older people needs more attention, there is a lack of analytical studies using correlation coefficients to determine

the effect of this association. This paper provides evidence of a strong correlation between physical activities and the life quality of the elderly. This study contributes to the current literature that is lacking, and contributes to current applications that are relevant to, and have implications for, elderly health care professionals. WHO predicts life expectancy will increase from 72.6 years to 77.1 years by 2050. However, in the least developed countries, it is 7.4 years lower than the global average. In addition, the United Nations data shows an alarming trend of population aging. In 2018, for the first time in history, the number of people aged 65 and over globally surpassed the number of children under the age of 5. The number of people aged 80 and over is forecast to triple, from 143 million in 2019 to 426 million in 2050. As life expectancy increases and birth rates decline, the world's population is aging. This is believed to be harmful to the global economy as the proportion of people of working age is smaller and the number of elderly people is higher, increasing the cost of health care.

Given the number of studies that have been performed to consider the correlation between physical activities and life quality in the elderly, it is necessary to consistently consider existing empirical studies on this correlation. Therefore, now there are very limited meta-analytical studies investigate the relevance of these two issues over the past years. Of the studies, few have analyzed this correlation, to measure the average effect size between physical activities and life quality.

The results of meta-analysis statistics can combine knowledge from many

different quantitative studies [6], [12], [22], [26], [28]. This has the benefits of using meta-analyses in individual studies. First, to distinguish it from qualitative assessments, meta-analysis allows researchers to reduce bias in evaluations, ensuring reliability [12]. For these reasons, and also the lack of such studies on physical activities and life quality in the elderly. Therefore, this issue needs to be explored further. Second, meta-analytical research allows to detection of trends and patterns or consider results from alternative studies [21]. Also, since the outcome of a meta-analysis can be a method of combining effect scales from a group of empirical studies, it provides an accurate estimate of the experimental sample, the average effect between research, and give accurate results [22]. Therefore, this article is a meta-analysis, to consider the correlation between physical activities and life quality in the elderly. To confirm their differences, between the studies done (2001-2010) and the studies (2011-2020) or not?; What is the correlation between physical activities and life quality in the elderly?

The hypothesis of this study may have implications for individual researchers and practitioners in healthcare and physical education.

According to He. W [23], UN, [35] by 2050, there are more than 703 million people aged 65 and over in the world and 1/6 of the global population over 65 years old. They are point out that “Peoples living longer, but that does not mean their life quality healthier”, and it is undeniable that Americans have degraded their life quality, between 1993-2001, [16], [13].

Thadathil's study [32], statistics on demographic factors: advanced age, legal status, employment, etc. Kang's family relationships and social support [2], Gallardo's non-secular association [20], and Sivertsen's depression [29]. Authors [1]; [5]; [8] states that the elderly's life quality is entirely related to sports activities. Life quality can be a broad idea, encompassing physical and mental state, social and emotional functioning (World Health Organization, 1993). As noted by the authors [1], [11], psychological factors such as trust, confidence, self-esteem have a positive effect due to the impact of physical activities. At the same time, Elavsky [1] also states that physical activities have a positive present and future influence on life quality in the elderly. In addition, using appropriate physical activities for each subject will be very effective in reducing the risk of age-related diseases and improving psychological health, as well as cognitive ability in the elderly [34].

Research Methods

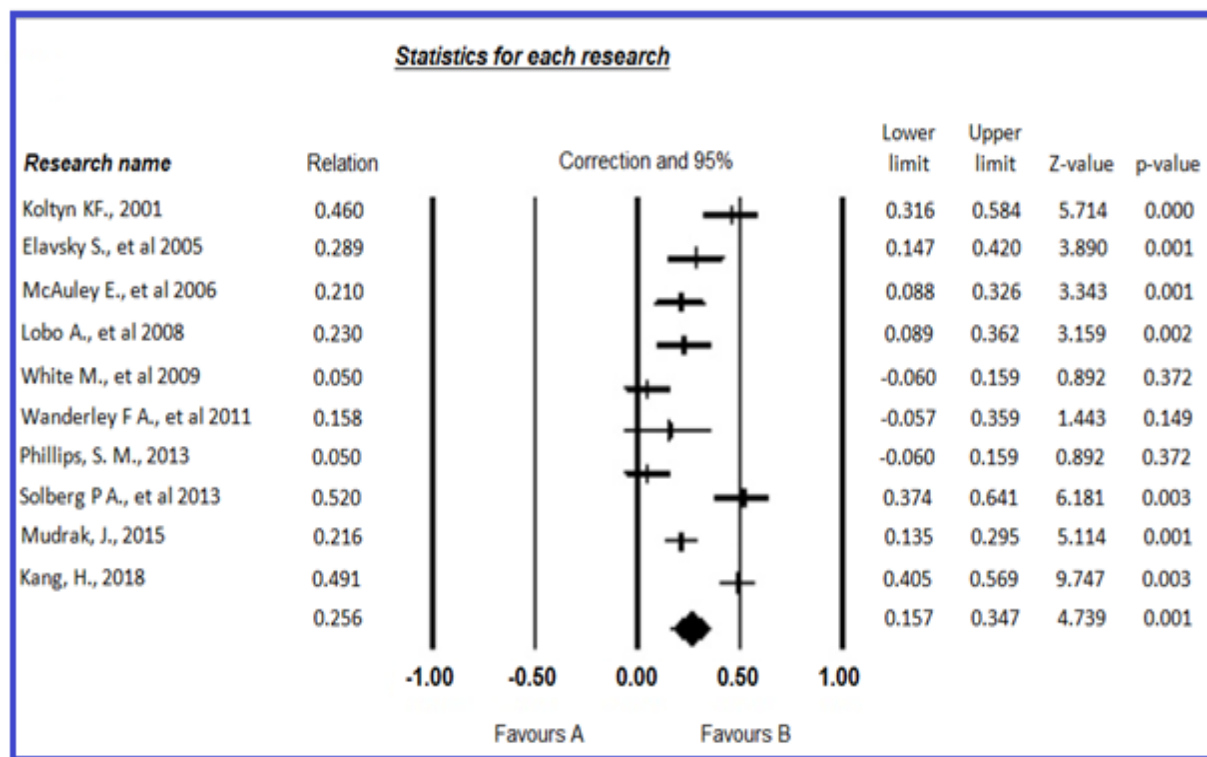
Criteria were suitable for this study.

Firstly, research statistics can be considered full text, from 2001 to 2020 will be attached in this research process. Second, the studies investigated the physical activities and life quality of older adults and reported a correlation between them. To identify articles with connected content through information search, and to retrieve relevant information about the relationship between physical activities and life quality,

the author used Scopus, Clarivate Analytics search tools, and Google Scholar, etc. In the method consider related articles, the author has carefully read the papers then excluded those that do not meet the 2 criteria mentioned. In addition, duplicates were eliminated in this method. With search and consideration, there were ten matches ($N = 10$; total elderly = 2466). Table 1 lists ten research findings that were conducted for this study. Analyze correlation and affect scale with SPSS 20.0 and Microsoft Excel software, these are the programs used by the majority of researchers, for their integrity, with one of the main aspects being the ability to convert between completely different indices of affect factor [14]. The author used a random effect model to consider the overall effect scale [15]. With “r correlation coefficient” used the effect size for this study.

Result

Affect level to a correlation between physical activities and life quality, performed with the ten studies listed in Table 1. To stabilize the variance in the integrated analysis, the author used the correlation transformation of each study to Fisher's Z-scale. The effect size across all ten studies was 0.256 (lower limit = 0.157, upper limit = 0.347, Fisher's $Z = 4739$, reliability $p < 0.001$). These results confirmed that elderly participation in physical activities has a positive effect on life quality. Table 1 represents the effect sizes of the studies.

Table 1. The affect scale of the studies and the effect overall average scale.

At the same time, the study performed a separate group analysis, the separate groups performed to consider whether the affect scale was different between the studies before 2010 and the studies from 2011 onwards (2011-2020). The effect size results for each group are statistically significant. For the 2001-2010 studies ($n = 5$), the effect size was 0.215, (Lower limit = 0.116, Upper limit = 0.312, Fisher's $Z = 3.912$, reliability $p < 0.001$) and the 2011-2020 studies ($n = 5$), the effect size was 0.253 (Lower limit = 0.128, Upper limit = 0.431, Fisher's $Z = 3.323$, reliability $p < 0.001$). However, carefully consider the affect scale between studies before 2010

(2001-2010) and studies 2011 and later (2011-2020) (Q -value = 2.501, reliability $p = 0.051$).

The squared value of “ I ” was used to analyze inconsistency in this study. There are three main levels in the “ I ” squared value for determining inter-study differences [24], [6]: First: square ($I < 20\%$) means low heterogeneous, Second: the square of the value ($I = 50\%$), which means there is a high degree of heterogeneous, Third: square of the value ($I > 75\%$), which means high heterogeneous degree. The result of this study, the square of the value ($I = 82,231\%$), shows a very high degree of heterogeneity.

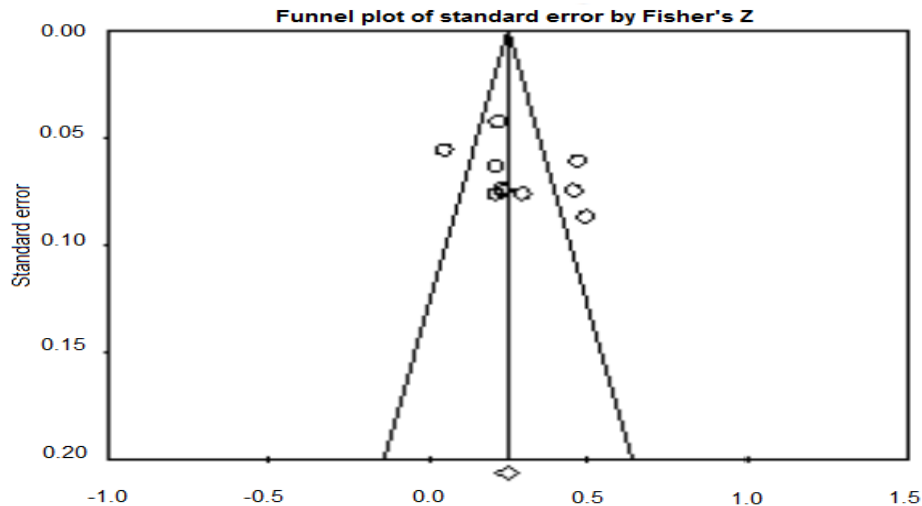


Figure 1. Publication bias meta-analysis of studies

Consider publication bias, which is crucial for the existence of publication bias in a study. It is believed to be biased towards negative stakeholder findings when deciding whether or not to publish a study [30]. Therefore, such studies have the potential to combine using meta-analysis, through which analytical researchers can prove their research manuscripts, to confirm the applied academic significance of their findings [25]. Publication bias occurs once in experimental studies and publication bias is more pronounced in studies with positive outcomes than in studies with negative outcomes [31]. The use of funnel charts to visually assess the amount of variation between analytical results, is the widely used publication bias measure of researchers [25]. As shown in Figure 1, the symmetry between the studies (shown in the cells) indicates that the studies are truthful, while the asymmetrical cells indicate dishonesty. In this study, the results show that the histogram shows symmetrical plots, which confirms that the studies are truthful.

Discussion

The results of this study demonstrate a correlation between physical activities and life quality in the elderly. This we confirm and strongly support the idea that when older adults participate in physical activities, they have an improved life quality. They benefit greatly from what physical activity brings to them and reduce the risk of diseases of old age such as coronary heart disease, strong bones, lower high blood pressure, diabetes, reduced anxiety, and depression. [34].

Damiot et al. [17] state that during the COVID-19 pandemic, some elderly experience loneliness and depression because they do not have access to nursing homes. One of the campaign's recommendations is that people do physical activities to stay healthy at home, especially the elderly. At the same time, healthcare professionals serving the elderly can develop online physical activities programs for them.

The results of the study have both high scientific significance and great contributions to health care professionals and managers, teachers, and coaches in the field of physical education and sports.

Uses the quantitative relationship of odds ratio and mean a difference to estimate mean effect size, often used to report meta-analyses in the health field, while scientific researchers Social studies are mainly based on the use of correlation coefficients r [26],[27],[28]. In addition, the correlation coefficients of the meta-analysis will allow researchers to perceive the results of the meta-analysis more efficiently [19]. The present study is in agreement with the results of Meungguk P, et al (2020) [6], and can extend the existing knowledge on this topic by using the correlation method in calculating effect size.

Many studies have demonstrated the effect factors between physical activities và life quality in the elderly, these studies often use the measured value of "I squared", many other variables, in which there is a variable "r correlation" to calculate the degree of correlation between physical activities và life quality in the elderly. Physical activities và life quality are correlated, as confirmed by McAuley [5]. In addition, a rigorous analysis is needed to cross-examine the physical activities và life quality of older people in low- and middle-income countries, because the analysis of aging in this country is still limited [18].

Limitations of this study.

This study was to collect only ten reports that met the matching criteria. Possibly, some studies have met these

criteria, and which may have been missed during the search. However, the results from this study's square "I" measure are still scientifically informative given the overall size of the participants (2466). Very few studies have performed a meta-analytic review of the association between physical activities and life quality in the elderly.

Conclusion

This result confirms that greater participation in physical activities is associated with better life quality in the elderly, and shows Inconsistency among the 10 studies that performed the analysis. The interesting finding of this paper extends the current literature on the topic, using a meta-analysis of correlation coefficients. For researchers, this study has special implications for elderly health care professionals - it highlights the importance of providing quality physical activities programs for people of all ages.

REFERENCES

1. Elavsky S., McAuley E., Motl W., Konopack F., Marquez X., Hu L., Diener E., "Physical activity enhances long-term quality of life in older adults: efficacy, esteem, and affective influences," *Annals of Behavioral Medicine: A Publication of the Society of Behavioral Medicine*, vol.30, no.2, pp.138–145, 2005.
doi:10.1207/s15324796abm3002_6
2. Kang H., Park M., Wallace J., "The impact of perceived social support, loneliness, and physical activity on quality of life in South Korean older adults," *Journal of Sport and Health*

- Science, vol.7, no.2, pp.237-244, 2018. doi:10.1016/j.jshs.2016.05.003
3. Koltyn K F., "The association between physical activity and quality of life in Older Women," *Womens' Health Issues*. Vol.11, no.6, pp. 471-80, 2001. doi:10.1016/S1049-3867(01)00128-1
 4. Lobo A., Santos P., Carvalho J., Mota J., "Relationship between intensity of physical activity and health-related quality of life in Portuguese institutionalized elderly," *Geriatrics & Gerontology International*, vol.8, no.4, pp.284-290, 2008. doi:10.1111/j.1447-0594.2008.00478.x
 5. McAuley E., Konopack J F., Motl R W., Morris K S., Doerksen S E., Rosengren K R., "Physical activity and quality of life in older adults: influence of health status and self-efficacy.," *Annals of Behavioral medicine: A Publication of the Society of Behavioral Medicine*, vol.31, no.1, pp.99-103, 2006. doi:10.1207/s15324796abm3101_14
 6. Meungguk P., Emeka A., Heejine SH., Simon M P., Morgan C., "Relationship between physical activity and quality of life in older adults: A metaanalysis.," *Journal of Physical Education and Sport*, Vol.20, no.6, pp. 3467 - 3477, 2020. DOI:10.7752/jpes.2020.06468
 7. Mudrak J., Stochl J., Slepicka P., Elavsky S., "Physical activity, self-efficacy, and quality of life in older Czech adults.," *European Journal of Ageing*, vol.13, no.1, pp.5-14, 2015. doi:10.1007/s10433-015-0352-1
 8. Phillips S M., Wójcicki T R., McAuley E., "Physical activity and quality of life in older adults: An 18-month panel analysis.," *Quality of Life Research: An International Journal of Quality of Life Aspects of Treatment, Care and Rehabilitation*, vol.22, no.7, pp.1647-1654, 2013. doi:10.1007/s11136-012-0319-z
 9. Solberg P A., Halvari H., Ommundsen Y., "Linking exercise and causality orientations to change in well-being among older adults: does change in motivational variables play a role?" *Journal of Applied Social Psychology*, vol.43, no.6, pp.1259-1272, 2013. doi:10.1111/jasp.12088
 10. Wanderley F A., Silva G., Marques E., Oliveira J., Mota J., Carvalho J., "Associations between objectively assessed physical activity levels and fitness and self-reported healthrelated quality of life in community-dwelling older adults.," *Quality of life Research: An International Journal of Quality of Life Aspects of Treatment, Care and Rehabilitation*, vol.20, no.9, pp.1371-1378, 2011. doi:10.1007/s11136-011-9875-x
 11. White S M., Wójcicki T R., McAuley E., "Physical activity and quality of life in community dwelling older adults.," *Health and Quality of Life Outcomes*, vol.7, no.10, pp.1-7, 2009. doi:10.1186/1477-7525-7-10

12. Akobeng A K., “Understanding systematic reviews and meta-analysis.” *Archives of Disease in Childhood*, vol.90, no.8, pp.845–848, 2005. doi:10.1136/adc.2004.058230
13. Baernholdt M., Hinton I., Yan G., Rose K., Mattos M., “Factors associated with quality of life in older adults in the United States.” *Quality of Life Research: An International Journal of Quality of Life Aspects of Treatment, Care and Rehabilitation*, vol.21, no.3, pp.527–534, 2012. doi:10.1007/s11136-011-9954-z.
14. Bax L., Yu L M., Ikeda N., Moons K G., “A systematic comparison of software dedicated to metaanalysis of causal studies.” *BMC Medical Research Methodology*, vol.7, no.40, 2007. doi:10.1186/1471-2288-7-40
15. Borenstein M., Hedges L V., Higgins J P T., Rothstein H R., “Introduction to meta-analysis.” Chichester: John Wiley & Sons, Ltd. Centers for Disease Control and Prevention. (2020). Benefits of physical activity. 2009.
<https://www.cdc.gov/physicalactivity/basics/pa-health/index.htm>
16. Cire, B. (2016, March 28). World’s older population grows dramatically. National Institute of Aging. Retrieved from <https://www.nia.nih.gov/news/world-s-older-population-grows-dramatically>
17. Damiot A., Pinto A J., Turner J E., Gualano B., “Immunological implications of physical inactivity among older adults during the COVID-19 pandemic.” *Gerontology*, vol.66, pp.431–438, 2020. doi:10.1159/000509216
18. Daskalopoulou C., Stubbs B., Kralj C., Koukounari A., Prince M., Prina A M., “Physical activity and healthy ageing: A systematic review and meta-analysis of longitudinal cohort studies.” *Ageing Research Reviews*, vol.38, pp.6–17, 2017. doi:10.1016/j.arr.2017.06.003
19. Diener M J., Hilsenroth M J., Weinberger J., “A primer on meta-analysis of correlation coefficients: The relationship between patient-reported therapeutic alliance and adult attachment style as an illustration,” *Psychotherapy Research Methods*, vol.19, no.4-5, pp.519-526, 2009.
20. Gallardo-Peralta L P., “The relationship between religiosity/spirituality, social support, and quality of life among elderly Chilean people,” *International Social Work*, vol.60, no.6, pp.1498–1511, 2017. doi:10.1177/0020872817702433
21. Greenland S., O’Rourke K., Meta-analysis. In K. J. Rothman, S. Greenland, & T. L. Lash (Eds.), *Modern Epidemiology* (pp. 652–682). 3rd ed. Philadelphia: Lippincott Williams, 2008.
22. Haidich A B., “Meta-analysis in medical research,” *Hippokratia*, vol.14, Suppl 1, pp.29–37, 2010.
23. He W., Goodkind D., Kowal P., “An Aging World: 2015: International

- Population Reports,” Report for the United States Census Bureau. Retrieved from <https://www.census.gov/content/dam/Census/library/publications/2016/demo/p95-16-1.pdf>
24. Higgins J P T., Thompson S G., Deeks J., Altman D G., “Measuring inconsistency in meta-analyses.” *BMJ: British Medical Journal*, vol.327, no.7414, pp.557–560, 2003. doi:10.1136/bmj.327.7414.557
25. Homberg F., McCarthy D., Tabvuma V., “A meta-analysis of the relationship between public service motivation and job satisfaction.” *Public Administration Review*, vol.75, no.5, pp.711-722, 2015.
26. Kelley S., Hootman J M., Jones D L., “Exercise and health-related quality of life in older community-dwelling adults: A meta-analysis of randomized controlled trials,” *Journal of Applied Gerontology*, vol. 28, no.3, pp.369-394, 2009.
27. Krasnikov A., Jayachandran S., “The relative impact of marketing, research and development, and operations capabilities on firm performance,” *Journal of Marketing*, vol.72, no.4, pp.1-11, 2008.
28. Raafs B., Karssemeijer E., Van L., Aaronson J A., Olde Rikkert M., Kessels R., “Physical exercise training improves quality of life in healthy older adults: A meta-Analysis.” *Journal of Aging and Physical Activity*, vol.28, no.1, pp.81–93, 2020. doi:10.1123/japa.2018-0436
29. Sivertsen H., Bjørkløf GH., Engedal K., Selbæk G., Helvik A S., “Depression and quality of life in older persons: A review,” *Dementia and Geriatric Cognitive Disorders*, vol.40, no.5-6, pp.311-339, 2015. doi:10.1159/000437299
30. Soeken K L., Sripusanapan A., “Assessing publication bias in meta-analysis,” *Nursing Research*, vol.52, no.1, pp.57–60, 2003. doi:10.1097/00006199-200301000-00009
31. Stanley T D., “Meta-regression methods for detecting and estimating empirical effect in the presence of publication selection,” *Oxford Bulletin of Economics and Statistics*, vol.70, pp.103-127, 2008.
32. Thadathil S., Jose R., Varghese S., “Assessment of domain wise quality of life among elderly population using WHO-BREF Scale and its determinants in a rural setting of Kerala”, *International Journal of Current Medical and Applied Sciences*, vol.7, no.1, pp.43-46, 2015.
33. U.S. Census Bureau. (2017). Older Americans Month: May 2017. Retrieved from <https://www.census.gov/content/dam/Census/newsroom/facts-for-features/2017/cb17-ff08.pdf>
34. U.S. Department of Health and Human Services’ Center for Disease Control and Prevention. (2020). About physical activity. Retrieved from <https://www.cdc.gov/physicalactivity/about-physicalactivity/index.html>

35. United Nations, Department of Economic and Social Affairs, Population Division (2019). World Population Ageing 2019: Highlights (ST/ESA/SER.A/430). Retrieved from <https://www.un.org/en/development/desa/population/publications/pdf/ageing/WorldPopulationAgeing2019-Highlights.pdf>
36. World Health Organization. (2020). Be active at home during #COVID 19 outbreak. Retrieved from <https://www.who.int/news-room/campaigns/connecting-the-world-to-combatcoronavirus/healthyathome/healthyathome---physical-activity>