

Systematic review of the effect of physical activity and religiosity on anxiety, depression, stress and quality of life in older people

Revisão sistemática do efeito da atividade física e religiosidade na ansiedade, depressão, estresse e qualidade de vida em pessoas idosas

Revisión sistemática del efecto de la actividad física y la religiosidad sobre la ansiedad, la depresión, el estrés y la calidad de vida de las personas mayores

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Abstract

Aims: A systematic review to determine the effect of physical activity and religiosity on anxiety, depression, stress and quality of life in older people. **Methods:** The LILACS, MEDLINE/PUBMED, SCIELO, and COCHRANE databases were searched. Titles, abstracts and keywords of original articles published in English from January 1990 to January 2019 were examined using the following DeCS descriptors: anxiety, depression, stress, quality of life, active, sedentary, religiosity, ageing, aging, older people. The operator 'or' was used between the descriptors ageing, aging and older people. In the screening, exclusion criteria were applied. Eighteen studies, from the initial sample of 47,494, remained at the end of this process. **Results:** This systematic review found that most of these eighteen studies focus on depression (16), stress (12), anxiety (11) and QOL (11). Depression was the foremost ageing concern. **Conclusions:** Although these descriptors are so often studied today, their synchronized relationship has not yet been studied. Further studies should be conducted to assess the effect of physical activity and religiosity on depression, anxiety, stress and quality of life in older people.

Keywords: Anxiety; Depression; Stress; Religiosity; Quality of life; Active; Sedentary; Older people.

Resumo

Objetivos: Uma revisão sistemática para determinar o efeito da atividade física e religiosidade na ansiedade, depressão, estresse e qualidade de vida em pessoas idosas. **Métodos:** Foram pesquisadas as bases de dados LILACS, MEDLINE / PUBMED, SCIELO e COCHRANE. Títulos, resumos e palavras-chave de artigos originais publicados em inglês de janeiro de 1990 a janeiro de 2019 foram examinados com os seguintes descritores DeCS: ansiedade, depressão, estresse, qualidade de vida, ativo, sedentário, religiosidade, envelhecimento, envelhecimento, idosos. O operador 'ou' foi usado entre os descritores envelhecimento, envelhecimento e idosos. Na triagem, foram aplicados critérios de exclusão. Dezoito estudos, da amostra inicial de 47.494, permaneceram ao final desse processo. **Resultados:** Esta revisão sistemática constatou que a maioria desses dezoito estudos enfoca depressão (16), estresse (12), ansiedade (11) e QV (11). A depressão era a principal preocupação com o envelhecimento. **Conclusões:** Embora esses descritores sejam tão frequentemente estudados hoje, sua relação sincronizada ainda não foi estudada. Novos estudos devem ser realizados para avaliar o efeito da atividade física e da religiosidade na depressão, ansiedade, estresse e qualidade de vida em idosos.

Palavras-chave: Ansiedade; Depressão; Estresse; Religiosidade; Qualidade de vida; Ativo; Sedentário; Idosos.

Resumen

Objetivos: Una revisión sistemática para determinar el efecto de la actividad física y la religiosidad sobre la ansiedad, la depresión, el estrés y la calidad de vida de las personas mayores. **Métodos:** Se realizaron búsquedas en las bases de datos LILACS, MEDLINE / PUBMED, SCIELO y COCHRANE. Los títulos, resúmenes y palabras clave de los artículos originales publicados en inglés desde enero de 1990 hasta enero de 2019 se examinaron utilizando los siguientes descriptores de DeCS: ansiedad, depresión, estrés, calidad de vida, activo, sedentario, religiosidad, envejecimiento, envejecimiento, personas mayores. El operador "o" se utilizó entre los descriptores envejecimiento, envejecimiento y personas mayores. En el cribado se aplicaron criterios de exclusión. Dieciocho estudios, de la muestra inicial de 47.494, quedaron al final de este proceso. **Resultados:** Esta revisión sistemática encontró que la mayoría de estos dieciocho estudios se centran en la depresión (16), el estrés (12), la ansiedad (11) y la calidad de vida (11). La depresión era la principal preocupación del envejecimiento. **Conclusiones:** Aunque estos descriptores se estudian con tanta frecuencia en la actualidad, aún no se ha estudiado su relación sincronizada. Deben realizarse más estudios para evaluar el efecto de la actividad física y la religiosidad sobre la depresión, la ansiedad, el estrés y la calidad de vida de las personas mayores.

Palabras clave: Ansiedad; Depresión; Estrés; Religiosidad; Calidad de vida; Activo; Sedentario; Personas mayores.

1. Introduction

Worldwide, the ageing human population has become a major challenge of the twenty-first century (Figueira, Giani, et al., 2009) (Figueira, Figueira, et al., 2009) (Figueira et al., 2008); globally, the population is ageing rapidly and will double in the next 50 years (WHO, 2017). The World Health Organization (WHO) defines older people as individuals aged 60 or older (World Health Organization, 2020), and maintaining their dignity is paramount to the study of factors related to their physical or moral pain. Quality of life (QOL) is conceptualized as a multidimensional parameter; it is a subjective perception of the ability to function well on a physical, mental and social level that can be measured in a reliable and valid manner by the use of self-reported questionnaires (Figueira et al., 2014) (Figueira et al., 2010).

Impacting QOL is depression, and worldwide, it is a common and important cause of morbidity and mortality (WHO, 2017). Depression and anxiety are present in at least 5-10% of older people and frequently appear as comorbidities (Kroenke et al., 2010). The prevalence of anxiety disorders in older people varies between 3,2 and 14,2%, with very few studies performed (Bruno & Lepetit, 2015). Depression, anxiety and stress have been found to be associated with negative emotions and pain in different studies (Tang & Tse, 2014). Dysfunctional beliefs about emotions play an important role in the aetiology and maintenance of anxiety, explaining unique variances in perceived stress, trait anxiety, low self-esteem and poor overall QOL (De Castella et al., 2014). Changes in subjects' beliefs about their emotions may play an important role in QOL (De Castella et al., 2014), as well as health responsibility and stress management, which are key to QOL improvement (Zhang et al., 2018). Regular physical activity exerts positive effects on anxiety (Schuch et al., 2019). Furthermore, the combination of stress and inactivity promoted by a sedentary lifestyle is linked to depression (Lok et al., 2017). Religious belief can stimulate the adoption of a more active lifestyle, as in general, religiosity influences lifestyle in a beneficial way (Bayram & Donchin, 2018).

Physical activity and ageing have opposite effects on life expectancy, and a sedentary lifestyle is a stressor that

triggers the stress responses culpable for many chronic diseases (Charansonney, 2011). The ageing process causes progressive reductions in functional capacity, muscle mass and strength, movement velocity, flexibility, joint motion ranges and muscle fibre elasticity (Varejao et al., 2014). Low levels of physical conditioning are associated with an increase in fat and progressive muscle decline, which are factors that can result in a reduction in muscle strength, flexibility (Varejao et al., 2014), aerobic capacity, QOL and functional autonomy (Figueira et al., 2014). These factors can limit older peoples' activities of daily living (ADL) (Dantas et al., 2014), and their ADL performance can benefit from being physically active, even in the short term (Varejao et al., 2014), which minimizes the detrimental effects of ageing (Dantas et al., 2014).

A rapid increase in the older population demands that health care be re-oriented to attend to both biophysical and psychosocial dimensions, which include life dissatisfaction as an indicator of depression (Ghimire et al., 2018). Ageing well is influenced by the quality of social relationships, which contributes to providing protection against anxiety, depression and loneliness (Stevens, 2013). Thus, measures investigating ageing and evaluating ageing effects on QOL must disclose relevant and actual realities (Figueira, Figueira, et al., 2009).

Depression, anxiety and stress are common and important causes of morbidity and mortality worldwide, and their relationship to QOL, religiosity and physical activity in older people's lives is starting to be understood, although no previous systematic review on this topic has ever been conducted. The purpose of this study was to perform a systematic review of depression, anxiety, stress, QOL, physical activity and religiosity in older people, aiming to determine the effect of religiosity and physical activity on depression, anxiety, stress and QOL in older people.

2. Methodology

This review was written based on PRISMA (Moher et al., 2009) guidelines and no other related protocols. This study systematically reviewed a set of scientific studies with variable study designs (cross-sectional, longitudinal, RCT, etc.) that were already performed and published. It incorporated independent evaluation criteria by two expert and qualified researchers.

The primary inclusion criteria were that selected articles must be original, written in the English-language, published between January 1990 and January 2019 in the databases LILACS, MEDLINE/PUBMED, SCIELO, and COCHRANE, and use the following descriptors chosen via DeCS (Health Science Descriptors): depression, anxiety, stress, religiosity, QOL, active and sedentary ageing/aging/older people. No other synonyms were adopted in this first step. This screening utilized filters of titles, abstracts and keywords. During this first screening step, the keywords were searched both individually and connected via the logical operator 'and'. During the second step, an eligibility criterion that the articles should involve older people as subjects was added. In the third step, there was an eligibility criterion that the articles should contain at least three descriptors.

A limiting bias in the first and second screening phases of this research was that there was no mechanism to avoid repetition of studies across utilized databases.

Screening occurred from December 2018 to January 2019. The PICO (Patients, Interventions, Comparisons, Outcomes) question terms contained in the search strategy were as follows: patient, older people; interventions, religiosity and physical activity; comparisons, non-religiosity and sedentary; outcomes, increase of QOL, decrease of depression, stress and anxiety. The PICO question that enhanced the search strategy was as follows: Patient (= older people); Interventions (= Religiosity / Physical Activity); Comparisons (= Non religiosity/Sedentary); Outcomes (= Increase of QOL / Decrease of Depression, Stress and Anxiety). In older people, religiosity and/or physical activity (either one or even both factors) in comparison to non-religiosity and/or sedentary living has the outcome of increasing the quality of life and/or decreasing depression, anxiety and/or physiological stress. The influence of religiosity and physical activity on depression, anxiety, stress and quality of life of older people is being studied currently.

The research involved four steps (Table 1) of searching for studies containing the research descriptors (individually and connected with ‘and’) in the listed databases (LILACS, PUBMED, SCIELO, and COCHRANE). Phase 1 consisted of a primary database search utilizing the keywords/descriptors. The second phase excluded studies that did not meet the criteria of being original research published in English or contain the selected keywords or utilize subjects aged 60 or older. For this exclusion, the operator OR was used between the descriptors ageing, aging and older people. The third phase selected the subset of studies that related at least three descriptors / keywords (depression, anxiety and/or stress) with religiosity and/or physical activity / inactivity and/or QOL.

Table 1 - Search strategy steps.

Steps	Inclusion Criteria	Filters	Researched Databases
1	Studies published in English from January 1990 until January 2019. Descriptors: depression, anxiety, stress, religiosity, quality of life, active ageing/aging/aged/elderly and sedentary elderly; both used individually and connected via the logical operator ‘and’.	Title & abstract & keywords	PUBMED<ncbi.nlm.nih.gov>&LILACS <pesquisa.bvsalud.org>&SCIELO<search.scielo.org>&COCHRANE <onlinelibrary.wiley.com>
2	All retrieved articles were screened to determine which met the following additional inclusion criteria: subjects age 60 or older.	Title & abstract & keywords	PUBMED& LILACS &SCIELO& COCHRANE
3	The selected relevant studies were judged based on relating depression, anxiety or stress with either religiosity or physical activity or with quality of life.	Title & abstract & keywords	PUBMED& LILACS &SCIELO& COCHRANE
4	The selected relevant studies were read in their full version.	Full version	PUBMED& LILACS &SCIELO& COCHRANE

Source: Authors.

3. Results and Discussion

This study was conducted in the four phases described as follows. Search results with three selection phases. The first phase of this study, was not limited in the screening process by ageing criteria or by the specificity of the studies. A broad range of studies identified in the first phase suggested that these keywords are considered most relevant by academic researchers. In the second stage, the screening process was limited to studies involving older people, and narrowing the search to studies focused on ageing showed that studying ageing effects on selected descriptors was relevant. In the third stage, by screening selected studies relating three or more of the keywords, we observed that at present, there is a lack of studies integrating these factors. This research in its first phase identified a total of 47,494 articles utilizing both the individual descriptors and their combination: depression (7086 articles), anxiety (4804 articles), stress (10385 articles), religiosity (321 articles), QOL (18576 articles), active ageing / aging / aged / older people (3906 articles) and sedentary older people (2416 articles). The adopted combinations were depression and anxiety (2676 articles), depression and stress (1229 articles), depression and religiosity (19 articles), depression and QOL (2245 articles), depression and active ageing / aging / aged / older people (676 articles), depression and sedentary older people (80 articles), anxiety and religiosity (16 articles), anxiety and stress (1112 articles), anxiety and QOL (1442 articles), anxiety and active ageing / aging / aged / older people (524 articles), anxiety and sedentary older people (64 articles), stress and religiosity (11 articles), stress and QOL (1419 articles), stress and active ageing / aging / aged / older people (493 articles), stress and sedentary older people (68 older people), religiosity and QOL (27 articles), religiosity and active ageing / aging / aged / older people (15 articles), religiosity and sedentary older people (2 articles), QOL and active ageing/aging/older people (631 articles), QOL and sedentary older people (24 articles), active ageing / aging / aged / older people and sedentary older people (39 articles).

This research identified 372 studies in its second phase after screening all 47,494 articles to determine which ones met the criteria of being original research published in English and of being studies about the selected keywords including subjects age 60 or older. The studies utilized both the individual descriptors [depression (12 articles), anxiety (2), stress (14), religiosity (46), QOL (27), active ageing / aging / aged / older people (70) and sedentary ageing / aging / aged / older people (37)] and various combinations of descriptions [depression and anxiety (17), depression and stress (11), depression and religiosity (16), depression and quality of life (6), depression and active ageing / aging / aged / older people (8), depression and sedentary ageing / aging / aged / older people (3), anxiety and religiosity (4), anxiety and stress (4), anxiety and QOL (3), anxiety and active ageing / aging / aged / older people (1), anxiety and sedentary ageing / aging / aged / older people (1), religiosity and stress (3), religiosity and QOL (14), religiosity and active ageing / aging / aged / older people (2), religiosity and sedentary ageing / aging / aged / older people (2), stress and QOL (5), stress and active ageing / aging / aged / older people (2), stress and sedentary ageing / aging / aged / older people (5), QOL and active older people (27), QOL and sedentary ageing / aging / aged / older people (5), and active and sedentary ageing / aging / aged / older people (26)].

In this research's third phase, studies were selected that related at least three descriptors/keywords (depression, anxiety and/or stress) with religiosity and/or physical activity/inactivity and/or with QOL. There were 20 articles relating at least three factors: depression, QOL and active ageing / aging / aged / older people (1 article), depression, anxiety stress, religiosity and QOL (1 article), depression, anxiety and stress (4 articles), depression, anxiety, stress and QOL (1 article), depression, stress and religiosity (1 article), depression, anxiety, stress and active ageing / aging / aged / older people (2 articles), depression, anxiety, stress, active and sedentary ageing / aging / aged / older people (1 article), QOL, active and sedentary ageing / aging / aged / older people (2 articles), depression, religiosity and QOL (2 articles), religiosity, QOL and active ageing / aged / aged / older people (1 article), depression, religiosity and QOL (1 article), anxiety, stress and QOL (2 articles), and anxiety, stress, religiosity and QOL (1 article).

At the conclusion of phase 3, two articles were excluded because they were reviews (Charansonney, 2011)(Jarvik & Russell, 1979). No duplicates were found at this point, resulting in zero exclusions for this reason. There were no other associations found in these selected studies between these research descriptors/keywords and those detailed above.

After the screening performed in the three initial phases was completed, the eighteen (18) selected studies that met the third criterion were carefully read them in full version and thoroughly analysed them. The characteristics of the eighteen selected studies included in this actual systematic review are summarized in Table 2.

Table 2 - Characteristics of the 18 selected studies relating at least three descriptors.

Authors	Sample	Age	Depression	Anxiety	Stress	Religiosity	Quality of Life	Physical Activity	Sedentary	AREA
Figueira et al., 2012	n=70	69±7yrs	Yes	no	no	no	yes	Yes	No	Minas Gerais, Brazil
Fry PS, 2001	n=101	65 to 87 yrs	Yes	yes	yes	yes	yes	No	No	Southern Alberta
Moser et al., 2010	n=1167	>60 yrs	Yes	yes	yes	no	no	No	No	Kentucky, Lexington, U.S.A
Luz et al., 2003	n=46	60-91yrs	Yes	yes	yes	no	no	No	No	Rio Grande do Sul, Brazil
Nelson et al., 2009	n=716	68±10 yrs	Yes	yes	yes	no	yes	No	No	Throughout U.S.A.
Todaro et al., 2003	n=498	60.3±7.9 yrs	Yes	yes	yes	no	no	No	No	Massachusetts, USA
Choi, et al., 2009	n=213	>60 yrs	Yes	No	yes	yes	no	No	No	Texas, U.S.A.
Anton et al., 2005	n=23	58±8.6yrs	Yes	yes	yes	no	no	Yes	No	California, U.S.A.
Bonura et al., 2014	n=98	65-92yrs	Yes	yes	yes	no	no	Yes	Yes	Florida, U.S.A
Fortuno-Godes J. et al., 2013	n=2185	>60 yrs	No	No	no	no	yes	Yes	Yes	Spain
Johnson W. et al., 2011	?	70 yrs	Yes	yes	yes	no	no	Yes	No	Scotland
Jang Y. et al., 2006	n=150	82.8±9.4yrs	Yes	No	no	yes	yes	No	No	Florida, U.S.A
Ladusingh L. et al., 2016	n=1255	>60 yrs	Yes	No	no	yes	yes	Yes	No	India
Meisenhelder, J.B.	n=271	>65 yrs	Yes	Yes	no	yes	yes	No	No	Massachusetts, Boston, U.S.A.
Roh, S. et al., 2014	n=200	>60 yrs	Yes	No	no	yes	yes	No	No	New York, U.S.A.
Brummer, et al., 2014	n=85	>60 yrs	Yes	Yes	yes	no	yes	No	No	South Hampton, U.K.
Vahia, I.V. et al., 2011	n=1973	>60 yrs	Yes	No	yes	yes	yes	No	No	San Diego, U.S.A.
Imamura, Y. et al., 2017	n=317	>65 yrs	No	Yes	yes	no	Yes	No	No	Japan

Source: Authors.

Through this systematic review process, 18 eighteen studies published in select research databases that examined at least three of the systematic review descriptors/keywords were identified. These eighteen studies focused mainly on depression (16), stress (12), anxiety (11) and QOL (11). Fewer focused on religiosity (7) and active ageing / aging / aged / older people (6), and sedentary ageing / aging / aged / older people (2) were the focus of the fewest number of articles. It was also observed that eight of the articles related depression with anxiety and stress, which emerged as the most common theme, followed by the

association between religiosity and QOL (6). It was also observed that it is not yet common to associate these keywords with each other, as only two studies associated five of them, four studies associated four of them, and eleven studies associated three of them. Table 3 presents the methodology of and the interventions applied in the incorporated studies, including instruments utilized to collect and analyse data, research design, type and frequency of intervention, and results of the intervention.

Table 3 - Methods and Intervention of the 18 selected studies

Authors	Collecting Data Instrument	Instrument Analysis Data	Significance Level	Research Design	Intervention	Duration	Intervention's Frequency	Intervention Results
Figueira et al., 2012	Questionnaire	ANOVA, Shapiro-Wilk	P<0.001	Descriptive Enquiry	Strengthening, stretching, walking	12-weeks,	Twice a week ,50 minutes	yes
Fry PS, 2001	Questionnaire	Regression Analysis	P<0.05	Cross-sectional longitudinal	No intervention	no	No	No intervention
Moser et al.,2010	Questionnaire	ANOVA, ANCOVA, Bonferroni	P<0.05	Multicenter comparative	No intervention	No	No	No intervention
Luz et al.,2003	Questionnaire, Laboratory Assessment	Kolmogorov-Smirnov, ANOVA, Student-t, Chi-square, Pearson	P<0.05	Cross-sectional	No intervention	no	No	No intervention
Nelson et al.,2009	Questionnaire	Multiple regression, multivariate analyses	P<0.01	Cross-sectional	No intervention	No	No	No intervention
Todaro et al.,2003	Questionnaire, Laboratory Assessment	Regression Analyses, Chi-square, correlation	P<0.005	longitudinal	No intervention	no	no	No intervention
Choi, et al.,2009	Questionnaire	Bi-variate, correlations, multivariate regression	P<0.001	Cross-sectional	No intervention	no	No	No intervention
Anton et al.,2005	Questionnaire	Bivariate correlations, regression	P<0.05	Cross-sectional study	No intervention	No	no	No intervention
Bonura et al.,2014	Questionnaire, Intervention	ANOVA, Regression, Pearson, ANCOVA	P<0.001	Randomized controlled trial study	yoga	six-week period	once a week, 45 minutes	yes
Fortuno-Godes J. et al.,2013	Questionnaire	Parametric statistics	P<0.05	Cross-sectional	Walking, tai-chi, water activities, petanque, keep-fit	Not informed	Not informed	yes
Johnson W. et al.,2011	Questionnaire	Linear Regression	P<0.01	Cross-sectional design survey	No intervention	no	no	No intervention
Jang Y. et al.,2006	Questionnaire	Bi-variate, correlations, multivariate regression	P<0.05	Cross-sectional design survey	No intervention	no	no	No intervention
Ladusingh L. et al.,2016	Questionnaire	Pearson's Chi-Square, Multilevel Model	P<0.01	Cross-sectional design survey	No intervention	no	no	No intervention
Meisenhelder, J.B.	Questionnaire	Pearson correlation	P<0.03	Cross-sectional design survey	No intervention	no	no	No intervention
Roh, S. et al.,2014	Questionnaire	Regression	P<0.05	Cross-sectional design	No intervention	no	no	No intervention
Brummer, et al.,2014	Questionnaire, Self-report Scale	t-test, Anova, Bonferroni, post-hoc	P<0.01	Cross-sectional design	No intervention	no	no	No intervention
Vahia, I.V. et al.,2011	Questionnaire, Self-report Scale	Spearman, Kruskal-Wallis, Bonferroni, Regression	P<0.004	Cross-sectional survey	No intervention	no	no	No intervention
Imamura, Y. et al.,2017	Questionnaire, blood samples, personal contact	t-test, Person, Regression	P<0.05	Cross-sectional design survey	No intervention	no	no	No intervention

Source: Authors.

Concerning the methods and interventions, it can be observed from Table 3 that out of the eighteen selected studies, only three studies (Bonura & Tenenbaum, 2014)(Figueira et al., 2012)(Fortuno-Godes et al., 2013) included physical activity intervention, while eighteen studies adopted questionnaires to collect data of which three (Luz et al., 2003)(Todaro et al., 2003)(Imamura et al., 2017) included laboratory assessment data collection. The summarized details of the included studies' descriptors, interviews, interventions, funding sources, follow-up procedures and limitations are presented in Table 4.

Table 4 - Descriptors, interviews, intervention, funding, follow-up and limitations of the selected studies.

Authors	Collecting Data Instrument	Instrument Analysis Data	Significance Level	Research Design	Intervention	Duration	Intervention's Frequency	Intervention Results
Figueira et al., 2012	Questionnaire	ANOVA, Shapiro-Wilk	P<0.001	Descriptive Enquiry	Strengthening, stretching, walking	12-weeks,	Twice a week ,50 minutes	yes
Fry PS, 2001	Questionnaire	Regression Analysis	P<0.05	Cross-sectional longitudinal	No intervention	no	No	No intervention
Moser et al.,2010	Questionnaire	ANOVA, ANCOVA, Bonferroni	P<0.05	Multicenter comparative	No intervention	No	No	No intervention
Luz et al.,2003	Questionnaire, Laboratory Assessment	Kolmogorov-Smirnov, ANOVA, Student-t, Chi-square, Pearson	P<0.05	Cross-sectional	No intervention	no	No	No intervention
Nelson et al.,2009	Questionnaire	Multiple regression, multivariate analyses	P<0.01	Cross-sectional	No intervention	No	No	No intervention
Todaro et al.,2003	Questionnaire, Laboratory Assessment	Regression Analyses, Chi-square, correlation	P<0.005	longitudinal	No intervention	no	no	No intervention
Choi, et al.,2009	Questionnaire	Bi-variate, correlations, multivariate regression	P<0.001	Cross-sectional	No intervention	no	No	No intervention
Anton et al.,2005	Questionnaire	Bivariate correlations, regression	P<0.05	Cross-sectional study	No intervention	No	no	No intervention
Bonura et al.,2014	Questionnaire, Intervention	ANOVA, Regression, Pearson, ANCOVA	P<0.001	Randomized controlled trial study	yoga	six-week period	once a week, 45 minutes	yes
Fortuno-Godes J. et al.,2013	Questionnaire	Parametric statistics	P<0.05	Cross-sectional	Walking, tai-chi, water activities, petanque, keep-fit	Not informed	Not informed	yes
Johnson W. et al.,2011	Questionnaire	Linear Regression	P<0.01	Cross-sectional design survey	No intervention	no	no	No intervention
Jang Y. et al.,2006	Questionnaire	Bi-variate, correlations, multivariate regression	P<0.05	Cross-sectional design survey	No intervention	no	no	No intervention
Ladusingh L. et al.,2016	Questionnaire	Pearson's Chi-Square, Multilevel Model	P<0.01	Cross-sectional design survey	No intervention	no	no	No intervention
Meisenhelder, J.B.	Questionnaire	Pearson correlation	P<0.03	Cross-sectional design survey	No intervention	no	no	No intervention
Roh, S. et al.,2014	Questionnaire	Regression	P<0.05	Cross-sectional design	No intervention	no	no	No intervention
Brummer, et al.,2014	Questionnaire, Self-report Scale	t-test, Anova, Bonferroni, post-hoc	P<0.01	Cross-sectional design	No intervention	no	no	No intervention

Vahia, I.V. et al.,2011	Questionnaire, Self-report Scale	Spearman, Kruskal-Wallis, Bonferroni, Regression	P<0.004	Cross-sectional survey	No intervention	no	no	No intervention
Imamura, Y. et al.,2017	Questionnaire, blood samples, personal contact	t-test, Person, Regression	P<0.05	Cross-sectional design survey	No intervention	no	no	No intervention

Source: Authors.

Sixteen studies focused on depression, as underlined in Table 4. Follow-up and intervention were rare, as well as funding. It can be observed that interview is the most frequent method of research adopted to research these descriptors.

In Table 5 the authors informed the studied Descriptors, whether or not there were face to face Interview, whether or not there was any kind of Intervention, if the study informed any financial Funding, if there was a longitudinal Follow-up.

Table 5 - Descriptors, Interview, Intervention, Funding and Follow-up.

Authors	Studied Descriptors	Face-to-face Interview	Intervention	Financial Funding	Longitudinal Follow-up
Figueira et al., 2012	D, QOL, PA	Yes	Yes	No	No
Fry PS, 2001	D, A, St, R, QOL	Yes	No	Yes	No
Moser et al.,2010	D, A, St	Yes	No	Yes	No
Luz et al.,2003	D, A, St	Yes	No	Yes	No
Nelson et al.,2009	D, A, St, QOL	Yes	No	No	No
Todaro et al.,2003	D, A, St	Yes	No	No	Yes
Choi, et al.,2009	D, St, R	Yes	No	No	No
Anton et al.,2005	D, A, St, PA	Yes	No	No	No
Bonura et al.,2014	D, A, St, PA, Sd	Yes	Yes	No	Yes
Fortuno-Godes J. et al.,2013	QOL, PA, Sd	Yes	Yes	No	No
Johnson W. et al.,2011	D, A, St, PA	Yes	No	Yes	Yes
Jang Y. et al.,2006	D, R, QOL	Yes	No	No	No
Ladusingh L. et al.,2016	D, R, QOL, PA	No	No	No	No
Meisenhelder, J.B.	D, A, R, QOL	No	No	Yes	No
Roh, S. et al.,2014	D, R, QOL	Yes	No	Yes	No
Brummer, et al.,2014	D, A, St	No	No	No	NO
Vahia, I.V. et al.,2011	D, St, R, QOL	No	No	Yes	No
Imamura, Y. et al.,2017	A, St, R	Yes	No	Yes	No

Source: Authors.

Highlights from the conclusions of the eighteen selected studies in this systematic review are as follows: Bonura (Bonura & Tenenbaum, 2014) found that physical activity immediately reduced depression, stress and anxiety and improved

QOL with cumulative and enduring effects. Figueira et al (Figueira et al., 2012) concluded that older people should be as physically active as their abilities and conditions allow to improve their QOL. Fortuno-Godes et al (Fortuno-Godes et al., 2013) selected 2,185 active older subjects compared with sedentary older subjects, with a total of 4061 participants in the survey; they observed that physically active older people had better QOL values than sedentary older people and concluded that differences were more obvious in the older age group ($p < 0.05$). Luz et al (Luz et al., 2003) recruited 46 healthy active older people for interviews and collection of samples for stress research and found that healthy ageing is associated with significant ($p < 0.001$) psychological distress. Todaro et al (Todaro et al., 2003) confirmed that negative emotions such as depression, anxiety and stress in older people are associated with low QOL.

Results from Fry et al (Fry, 2001) support the importance of religiosity and spirituality as major contributors to the alleviation of depression, anxiety and stress and to the improvement of the QOL of older adults. Moser et al (Moser et al., 2010), in a multicenter comparative study, concluded that healthy elders exhibit lower levels of anxiety and depression ($p < 0.01$). Nelson et al (Nelson et al., 2009) conducted a cross-sectional study on 736 older men, and the results support a pattern suggesting that overall distress ($p < 0.01$) and anxiety ($p < 0.01$) decrease and quality of life increases ($p < 0.01$) with age. Anton and Miller (Anton & Miller, 2005), in a cross-sectional study, observed that depression, stress and anxiety are connected to both harmful health practices (e.g. sedentary lifestyle) and the absence of positive health behaviours, especially physical activity ($p < 0.05$). Choi and Jun (Choi & Jun, 2009), in cross-sectional semi-structured interviews with 213 older adults, observed how depression can affect the QOL in late life and how physical and functional health problems are connected to depression ($p < 0.001$), but they observed that religiosity was not found to protect from depressive symptoms. Depression in older people is explained by factors such as regrets (money, family, health, loss, ...) and current life stressors (loneliness, overdependence, money, ...) and is compensated for by coping resources and religiosity. Johnson et al (Johnson et al., 2011) researched depression, anxiety and physical activity in old age in connection with psychological and physical health in old age. In a study using the microdata of 1255 older adults from the pilot survey for the Longitudinal Aging Study in India, Ladusingh et al (Ladusingh & Ngangbam, 2016) concluded that religiosity and regular physical exercise have a statistically significant ($p < 0.01$) positive effect on the QOL of older adults. Meisenhelder (Meisenhelder, 2003), in a random community survey of 217 older people, concluded that mental health is an outcome related to spiritual indices for older people of both sexes but mental health correlates with different indices for each sex: cognitive coping responses are associated with lower anxiety and depression in women ($p < 0.001$), whereas behavioural spiritual responses are the relevant variables for male mental health ($p < 0.021$). Roh et al (Roh et al., 2014) collected data via face-to-face interviews with 207 older Koreans residing in the New York City area between the January and May of 2009 and found that religiosity / spirituality was associated with greater life satisfaction and that the normally religious/spiritual group had significantly ($p < 0.05$) greater QOL although no difference was found in depression levels. Brummer et al (Brummer et al., 2014) recorded questionnaire responses from 85 subjects and found that older participants compared with younger participants reported less anxiety, depression and stress than adults with no age differences, suggesting a possible decline in anxiety and in psychological distress ($p < 0.01$) with increased age. Vahia et al (Vahia et al., 2011) applied a cross-sectional survey to 1,973 older women at the San Diego Clinical Center of Women Health and found that spirituality is a broad and multidimensional construct not associated with QOL or level of depression, in addition to finding that the majority of participants had few or no depressive symptoms. Imamura et al (Imamura et al., 2017) recruited 317 community-dwelling older people living in Japan for cross-sectional research, and the survey concluded that stronger belief in life after death might be associated with decreased relational distress or anxiety ($p < 0.001$). By assessing the effects of physical health constraints (as self-rated health) and psychosocial resources (as religiosity) on depressive symptoms, Jang et al. (Jang et al., 2006) observed the protective roles of psychosocial resources against physical health constraints, suggesting that religious coping in a healthy way and a positive attitude toward ageing for better mental health outcomes

should be developed ($p < 0.05$); they also observed higher levels of depressive symptoms among older subjects with less religiosity.

Discussion

Depression, anxiety and stress are currently morbidity factors that have a major impact on older people. The effect of religiosity and physical activity on depression, anxiety and stress are being progressively studied, but this systematic review observed that no study was published linking both together as factors influencing the depression, anxiety, stress and QOL of older people. However, this systematic review confirmed that separately, both physical activity and spirituality reduce depression, anxiety and stress in addition to improving the QOL of older people. Physical activity already has a confirmed influence on QOL, depression, anxiety and stress and religiosity might play a powerful role in increasing QOL and decreasing depression, anxiety and stress. Interviewing subjects is a broadly-accepted research method for investigating these descriptors because it was the most frequently adopted methodology and depression was the topmost ageing concern. This systematic research found only two studies associating five of these researched descriptors; therefore, the answer to the PICO question of whether these descriptors are linked in published studies is currently “No, they are not”. However, we are glad to note that the highlights of the 18 selected studies listed the results section indicate that there are already many lines of evidence interlinking the study areas / descriptors.

This systematic review found that most of the selected studies focused on depression, stress, anxiety and QOL. Its analysis determined that selected study keywords are often studied today (47,494 studies found), and therefore, these keywords are considered to be important by the scientific community. However, their unique interlinked relationship – taken together as a whole – has not yet been studied, and only eighteen studies were published on older people relating at least three of these keywords. To our knowledge, this is the first study to examine the relationship between religiosity and physical activity and the improvement of QOL and decreases in depression, anxiety and physiological stress on ageing / aging / older people. The studies included in this analysis suggest that the whole relationship is not being studied at a deep level, although the effects of physical activity were confirmed. The connection we were searching for that linked religiosity and physical activity to the increase of QOL and the decrease of depression, anxiety and stress was not found.

Worldwide, there is an increasingly comprehensive understanding of the benefits of implementing physical activity and spirituality to specifically address physical and psychological health issues. Some researchers observe spirituality in relation to perceived health, depression and QOL for older people, while others observe the effects of physical activity on the psychological health of older people. There is an understanding that physical activity affects functional autonomy and psychological health (Dantas et al., 2014) (Figueira et al., 2012)(Vagetti et al., 2020)(Santos et al., 2018)(Sowa et al., 2016)(Lawlor & Hopker, 2001). The effect of spirituality on physical (Shuval et al., 2008)(Whitt-Glover et al., 2008)(Bopp et al., 2006) and psychological status (Figueira, Figueira, et al., 2009) also improves the QOL of older people, as defined by WHO (WHO, 2017)(Singh et al., 2019)(Panzini et al., 2017). However, this is basically what is published on the topic: the conjoint influence of religiosity and physical activity on depression, anxiety, stress and QOL of older people is not being studied. Collecting all relevant findings and screening them with this systematic review is highly relevant to studies of this area of ageing.

This study has several implications for understanding the QOL of older people, according to its PICO question, since depression, anxiety, physiological stress, physical activity and religiosity are meaningful for older people’s QOL. Furthermore, religiosity and physical activity might be more effective for certain domains of QOL. To overcome depression, stress and anxiety and to provide more evidence regarding the suggested beneficial effects of physical activity and religiosity on QOL subdomains, future studies are needed. Facilitating spiritual participation and physical activity may enhance the QOL of older

people by mitigating depression, physiological stress and anxiety. Further studies should be conducted to assess the effect of religiosity and physical activity on depression, anxiety, stress and quality of life in older people. Public health interventions, professionals and programmes could benefit from this awareness and contribute to an improved QOL for older people.

4. Conclusion

Depression, anxiety and stress can be similar to bad moods, and similar to bad weather, can come and go, but most individuals will remain steady in the midst of these mood swings. Ageing is a phase of life that presents challenges as individuals come to terms with regrets from their past and fears for their future while embracing a new phase in life. The QOL of older people is affected by many negative factors whose impact can be reduced by religiosity and physical activity, but still, these negative factors remain as shadows of a past that was not so well accomplished, a future that can still look very uncertain or a present that does not lend itself to contentment. Furthermore, religiosity and physical activity traverse a broad spectrum, and their effects on improving QOL may vary across an equally broad range. That knowledge gap suggests that further studies should be performed to connect depression, stress, anxiety and QOL to religiosity and physical activity in ageing populations.

This systematic review suggests beneficial effects of religiosity and physical activity on depression, anxiety, stress and QOL in older people. To improve the QOL of older people, further prospective studies and randomized controlled trials should be conducted to evaluate and confirm the causal associations between the researched descriptors.

The main study limitation was that at both the first and second phases, there was no exclusion of repeated studies. Another limitation is that although we used thorough search strategies, there is still the possibility that some studies were missed. Furthermore, due to the heterogeneity of the study methods and results, no meta-analysis could be performed. Despite these limitations imposed by the sample size, our systematic review suggests that overall, the practice of physical activity and religiosity are associated with better QOL and reduced depression, anxiety and stress in older people.

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