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LATIN DANCES AND HEALTH: SCOPING REVIEW

Bakalářská práce

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Abstrakt:

Cílem této bakalářské práce je prozkoumat vztah mezi latinsko-americkými tanci a zdravím člověka. Literatura byla vyhledávána v elektronických databázích Scopus, PubMed, EBSCO a Web of Science, pomocí vyhledávací strategie s Booleovskými operátory a klíčových slov souvisejícími s latinsko-americkými tanci a zdravím. Bylo zahrnuto 56 vhodných studií z 19 různých zemí, přičemž všechny studie zahrnovaly buď intervenci využívající latinsko-amerických tanců, nebo účastníky se zkušenostmi v latinsko-amerických tancích. Výsledky ukázaly, že latinsko-americké tance mají fyzické, mentální, kognitivní, psychomotorické a posturální zdravotní přínosy u rekreačních i soutěžních tanečníků latinsko-amerických tanců. U rekreačních tanečníků latinsko-amerických tanců nebyly zjištěny žádné negativní účinky, ovšem u soutěžních latinskoamerických tanečníků zjištěny byly. Latinsko-americké tance jsou doporučovány, pro své četné pozitivní přínosy, zdravého životního stylu a fyzické a duševní pohody.

Klíčová slova:

Latinsko-americké tance, tanec, taneční sport, zdraví, pohybová aktivita, zdravý životní styl

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Abstract:

The aim of this thesis is to research the relationship between Latin-American dances and human health. A literature search was carried out in the electronic databases Scopus, PubMed, EBSCO, and Web of Science, using the search strategy with Boolean operators and keywords related to Latin-American dances and health. 56 suitable studies from 19 different countries were included, with all the studies including either Latin-American dances in their dance intervention or participants with an extended history of Latin-American dancing. The results showed that Latin-American dances promote physical, mental, cognitive, psycho-motor, and postural health benefits, to both recreational and competitive dancers of Latin-American dances. No negative effects of Latin-American dances on human health were identified among recreational dancers, but only among competitive Latin-American dancers. Frequent Latin-American dancing is recommended as it promotes numerous positive benefits of a healthy lifestyle and physical and mental well-being.

Keywords:

Latin-American dances, dance, dancesport, health, physical activity, healthy lifestyle

Prohlašuji, že jsem tuto práci zpracoval samostatně pod vedením doc. Mgr. Jany Pelclové, Ph.D., uvedl všechny použité literární a odborné zdroje a dodržoval zásady vědecké etiky.

V Olomouci dne 29. června 2022

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I would like to thank doc. Mgr. Jana Pelclová, Ph.D. for supervising my thesis, her expertise, and helpful insights provided during the preparation of this work.

Contents

1 INTRODUCTION

Latin-American dance and dance, in general, is a popular activity affecting various aspects of human life and it connects many different areas of enjoyment (competitive, leisure, social, therapeutic, musical, creative, etc.). It is currently a very accessible physical activity, that provides us the opportunity for the pursuit of a healthy lifestyle in today's world (Smith et al., 2010). Previous studies indicate that various dance forms can have positive benefits to human health, improving physical aspects of health, cardiovascular fitness, flexibility, and balance in healthy young people (Burkhardt & Brennan, 2012), and in people with various health conditions (Quinn & Blandon, 2017). According to (Pledger, 2016) dancing presents a great form of entertainment and physical exercise, that brings participants many benefits, both physically and mentally. According to my knowledge, no studies with the same goal of mapping out the available literature on the effects of Latin-American dances including samba, cha-cha-cha, rumba, paso doble, and jive has been made before. For that reason, it would be suitable to map available literature on the effects Latin-American dances have on human health.

2 BACKGROUND

This thesis is focused on the effects of Latin-American dances on human health. Because Latin-American dances can be implemented in many different forms of activity (leisure and recreational dancing, competitive dancing), it is important to make theoretical explanation of key concepts concerning Latin-American dancing.

2.1 Dance

Dance is the mother of arts. Music and poetry exist in time, painting, and architecture in space. But the dance lives at once in time and space. The creator and the thing created, the artist and the work are still one and the same thing. Rhythmical patterns of movement, the plastic sense of space, the vivid representation of a world seen and imagined – these things man creates in his own body in the dance before he uses substance and stone a word to give expression to his inner experiences (Sachs, 1965).

Dance has always been an “element of quality of life” and thus a value that would be unique to each of us. It has always accompanied humans during celebrations, ceremonies, festivities, in moments of unusualness, sometimes in mourning, sacrifice, and mostly in happy moments in life. Consequently, it brings entertainment, awareness of inner wealth and path, and a feeling of freedom and excitement (Zagorc, 2001).

Dance is a fundamental element of human behavior and has evolved over the years from the primitive movement of the earliest civilizations to traditional ethnic or folk styles, to the classical ballet and modern dance genres popular today. The term dance is broad and, therefore, not limited to the genres noted above. In the twenty-first century, dance includes ballroom, jazz, tap, aerobics, and a myriad of other movement activities. The joy derived from participating in dance of any genre and the physical activity required provide the opportunity for the pursuit of a healthy lifestyle in today’s world (Smith et al., 2010).

2.2 Social dancing

Desire for rhythmic movement is linked to the instinct of socialization and human interaction. The roots of social dancing go back to early historic time periods. Through the history early versions of dances were strongly linked to religion and folk customs. It was only in many centuries of separation from religion that dance became a recognised aesthetic form of human activity. Social dance is a type of dance that has never been tied to religion or ritual but has always served only as entertainment. It belongs to the ''younger'' genres of dance (Zagorc, 2001).

Social dance has always preserved its nature: it breaks down barriers between controlled behavior and relaxed expression of emotions, lifts a person into a special mood, relaxes, liberates the subconscious, allows enjoyment of a physical activity, and does not consider age restrictions (Zagorc, 2001).

Today social dances are comprised by dance schools mainly of standard dances and Latin-American dances. This type of dances are performed in a couple, a man and woman, who perform steps of dance together at the same time on music harmoniously. Standard (ballroom) dances include waltz, tango, Viennese waltz, foxtrot, and quickstep, while Latin-American dances include samba, cha-cha-cha, rumba, paso doble, and jive. The intensity of dances varies as some dances are slower and thus demand lower intensity from dancers, while some dances are faster and require higher energy output from dancers.

2.3 Competitive Latin-American dancing

2.3.1 Dancesport

Today's dancesport has evolved from social dancing and is one of the most beautiful, as well as one of the most demanding sports. It is one of the most structurally complex sports, where on one hand there is strong emphasis on energy and informational components, and on the other hand also on the aesthetics of movement. In its top form, dancesport is mastery of one's body in certain rhythm, which is determined by the genre of music, and simultaneous coordination between man and woman (Zagorc, 2001).

DanceSport is the activity that combines sport and dance, and that allows the participants to improve physical fitness and mental well-being, to form social relationships and to obtain results in competition at all levels (World DanceSport Federation, 2012).

Dancesport consists of five standard dances (waltz, tango, Viennese waltz, slow foxtrot, and quickstep), five Latin-American dances (samba, cha-cha-cha, rumba, paso doble and jive) and ten-dance (combination of both standard and Latin-American dances) (Zaletel et al., 2011).

2.3.2 Latin-American dances

Latin-American competitive dances include samba, cha-cha-cha, rumba, paso doble (which originates from Spain), and jive, which is of North American origin. In Brazil and Cuba, these dances developed mostly with the arrival of the colonialists. For the most part, they are a mixture of dance rhythm and steps brought by African, South American, and European immigrants (Zagorc, 2001).

Latin-American dances are mostly performed in open dance hold, which allows more expression and freedom of both dancers. Partnering between man and lady is crucial fundamental in this type of dances and it's important for the characterization of each individual dance (Zagorc, 2001).

Samba is a typical Brazilian dance that was formerly danced at various religious rituals, that served to swear gods. At such ceremonies, they danced together for several days. "Semba" is of african origin; it means movements with hips. The predecessor was batuque, which represented the common name for danced with typical hip movement and was danced at rituals. Samba first appeared in Europe as a social dance in 1924, but it did not penetrate until after 1948 with its simplified form. Today Samba is a national dance in Brazil, which is danced in many forms: samba del moro (danced on the roads during the carnival), samba carioca (derived from Rio de Janeiro, baiao (from Bahia), etc. Samba is a joyful and playful dance where movement with the hips comes to the fore. It has the characteristic bounce movement that derives from the movement of hips, knees, and feet (Zagorc, 2001).

Cha-cha-cha is the youngest of all the Latin-American dances, having originated in 1953 in Havana, Cuba. It is a rhythmically sophisticated type of dance and is a derivative of the mambo dance. It is an extremely temperamental dance, with a characteristic movement of hips and it's cha-cha-cha counting. Cha-cha-cha is characterized by the chasse step on the last beat in the bar and can be performed sideways, forward, or backward; this is followed by the step forward-backward or backward–forward, performed on the spot (Zagorc, 2001).

Rumba originates from Africa (Nigeria), from where it was brought to Cuba. At first it was danced in the shape of a square (danzon), followed by the faster form (guaracha), and then later the slowest form of rumba bolero and Cuban rumba, which we dance today. After the year 1950, Rumba was included in the competitive Latin-American dances. Rumba is a dance of love and is

seemingly a slow dance. It has many common features with cha-cha-cha, such as movement of the hips, knees, and feet. The main difference is the rhythm (Zagorc, 2001).

Paso doble originates from Spain and it demonstrates bullfighting. It is a demanding and extremely picturesque dance, where the female dancer represents la capo or muleto – a red cloth, with which the toreador – a male dancer challenges the bull. It is a typical Spanish dance, with a very pronounced rhythm. The steps of paso doble are solemn, highlighted, with a slight turning of the torso and heel-to-heel strikes (Zagorc, 2001).

Jive is the result of the breakthrough of jazz and swing after 1930. Swing marked the first transitional period to new dance forms of boogie woogie, be-bop, jitterburg and jive. After 1940, Jive was brought to Paris by American soldiers and later formed into a competitive dance. Jive is characterized by its lightness and pronounced movements of the knees (Zagorc, 2001).

2.4 Health

Definition of health formulated in 1948 by WHO describes health as a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity (World Health Organization, 2020).

Today, three types of definition of health seem to be possible and are used. The first is that health is the absence of any disease or impairment. The second is that health is a state that allows the individual to adequately cope with all demands of daily life (implying also the absence of disease and impairment). The third definition states that health is a state of balance, an equilibrium that an individual has established within himself and between himself and his social and physical environment (Sartorius, 2006).

Regular physical activity is proven to help prevent and treat numerous health issues in cardiorespiratory health, metabolic health, musculoskeletal health, cancer, functional health, prevention of falls and depression (World Health Organization, 2010).

3 AIMS

3.1 Main aim

To map out available information from databases on Latin-American dances and human health.

3.2 Further aims

1) To describe population group of studies related to Latin-American dances and human health.
2) To describe the types of dances and dance lessons related to Latin American dances and human health.
3) Define health aspects in studies (including injuries) related to Latin-American dances and human health.

3.3 Research question

1) What is known from existing literature about the relationship between health and the practice of Latin-American dancing?

4 METHODS

The literature search was conducted between 24th of February and 17th April 2022 on Scopus, PubMed, EBSCO, and Web of Science databases. The search strategy was largely modelled on the usage of keywords “ballroom”, “ballroom danc*”, “ballroom danc* injur*”, “ballroom danc* injury”, “ballroom danc* health, “dancesport”, “dance sport”, “dancesport health”, “dancesport injur*”, “latin ballroom danc*”, “latin ballroom danc* health”, “latin ballroom danc* injur*”, “latin danc*”, “latin danc* health“, “latin danc* injur*”, “samba health”, “samba injur*”, “chachacha health”, “chachacha injur*”, “rumba health”, “rumba injur*”, “paso doble health”, “paso doble injur*”, “paso-doble”, “jive health”, “jive injur*” and Boolean operators “OR” and “AND”.

An Excel file was created for screening and logging purposes. The title and abstract of the studies for each database were examined. After reading through the title and the abstract the studies were divided to either appropriate, not appropriate, or possibly appropriate. When the study was appropriate it was saved in a local computer file and bibliographical information (article identifier, authors, year of publication and study title) was saved in the excel file. In case the study was possibly appropriate, full text availability was verified. If available full text was screened, and then the study was either included to appropriate studies or excluded as not appropriate study.

4.1 Inclusion criteria

No year of publishment or geographical restrictions were set. Articles had to be published in English, Slovene or Czech language. The subject matter of the studies had to be Latin-American dances and their effect on health. Studies had to have dance intervention in which Latin-American dances (samba, cha-cha-cha, rumba, paso doble, jive) had to be included, or if there was no dance intervention, the subjects of the study sample had to be dancers or dancesport athlete with many years of experience dancing Latin-American dances.

4.2 Exclusion criteria

All articles on different types of dances and dance styles were excluded. Articles designed around dancesport that gave too much weight on standard dances were also excluded. Studies without clear findings were not included, neither were literature reviews.

4.3 Data extraction

Thorough reading of the articles allowed to extract data on authors, year of publication, study setting, characteristics of study sample (sample size, percentage of male and female population, mean age, description of the sample), characteristics of study (methods, measurements), frequency and type of dance intervention, health topic and main findings.

5 RESULTS

In the Scopus, PubMed, EBSCO and Web of Science databases, a total of 3961 articles were identified. Removing duplicates decreased the number of articles to 2624. After reading title and abstract, some articles got excluded based on criteria for inclusion. Out of 237 full-text articles assessed for eligibility 56 articles were selected for inclusion in the review. An overview of all the articles is presented in the Table 1 below. Out of 56 articles, 55 were published in the English language and 1 was published in the Slovenian language [54].

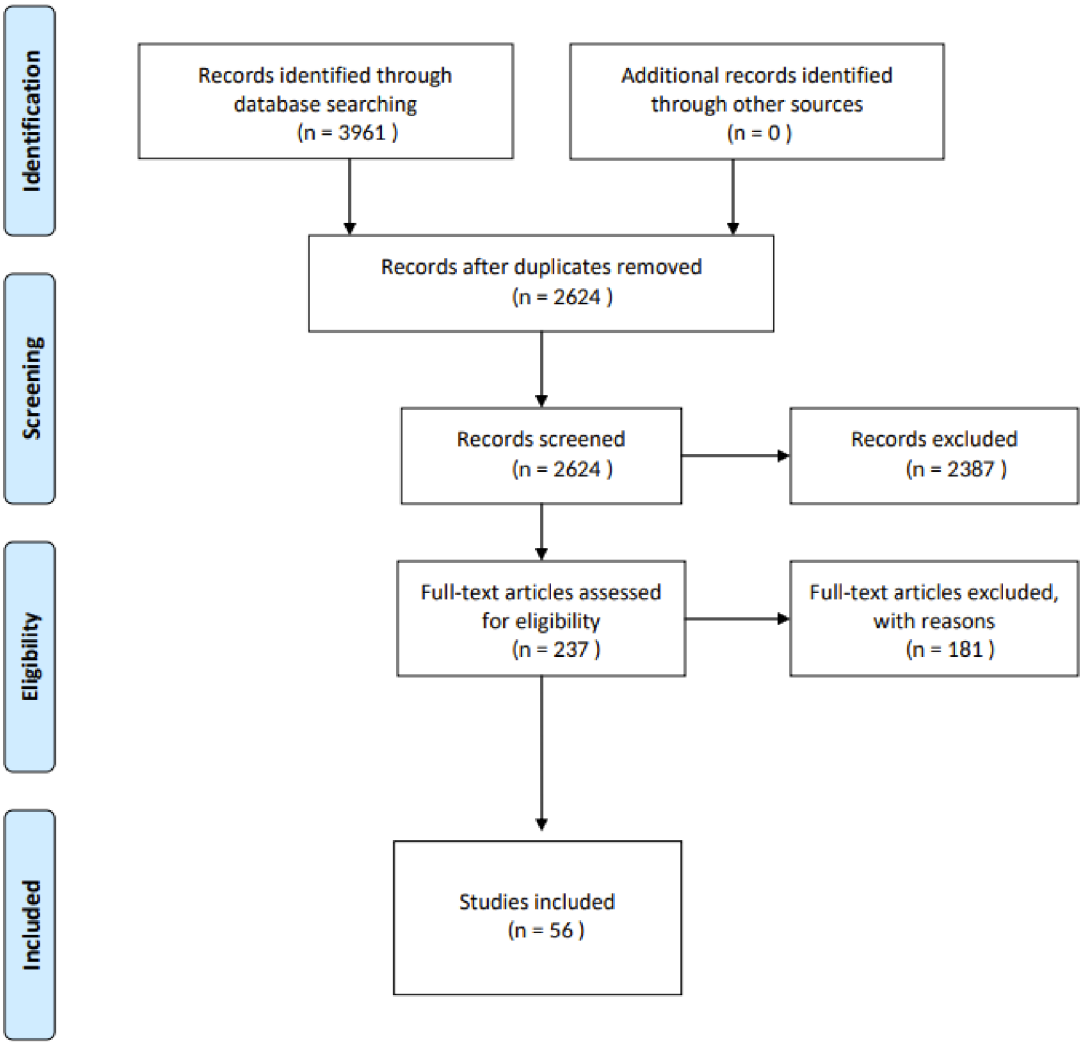

Figure 1. Flow of number of articles through different stages of review

5.1 Geographic location

The studies were from 19 different countries of all continents. Most studies were from Europe (60,7%), followed by Asia (14,3%), North America (10,7%) and South America (10,7%). Only one study originated from Africa (South Africa) [22], and one from Oceania (Australia) [5].

Representation of respective countries is shown in Figure 2, with 2 studies being conducted internationally with participants from many different countries [14, 34].

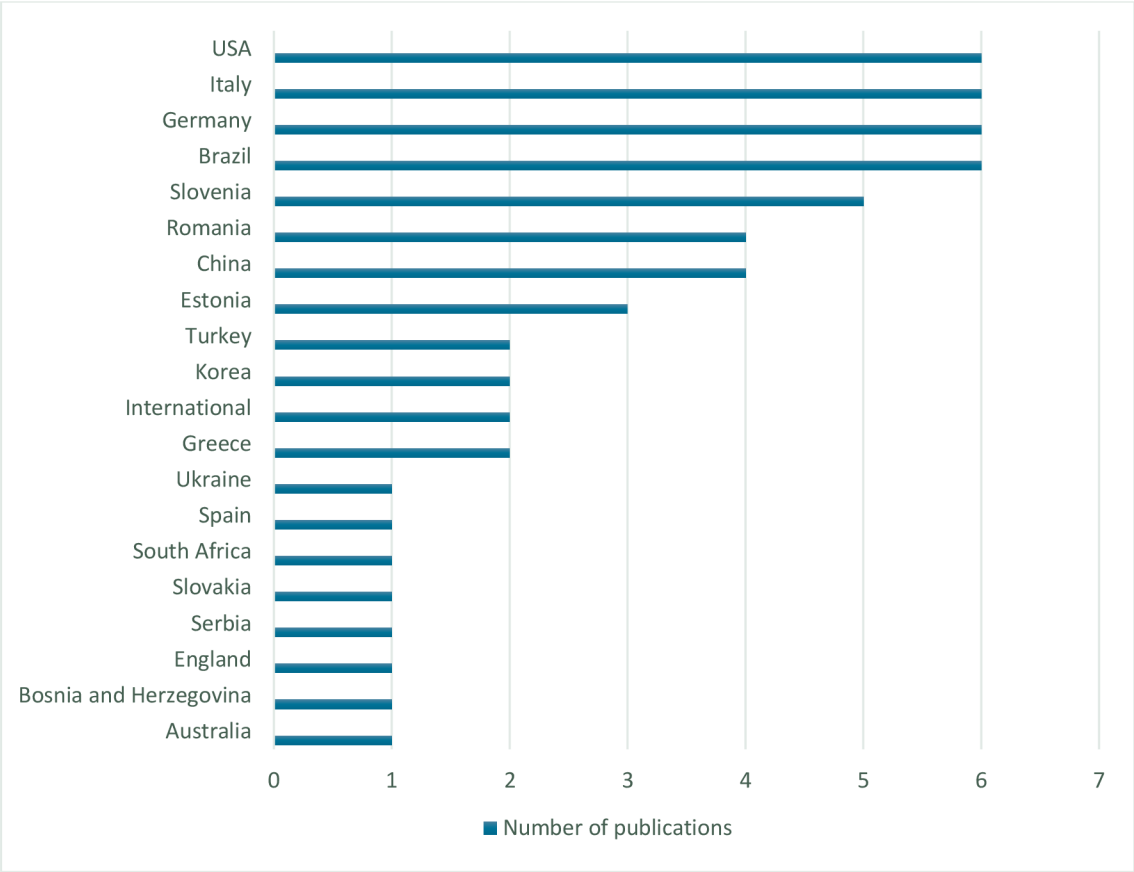

Figure 2. Representation of respective countries in the review

5.2 Study sample

Studies collectively included 5775 participants of all ages from 6 to 88 years. Study sample size in the articles varied from 6 [54] up to 901 [56].

Out of 56 Articles, in 9 studies target population were children and adolescents (5-17 years), in 29 studies target population were adults (18-60 years), 14 studies were targeted at older adults (>60 years), while 4 studies did not specify the age of the study sample [1, 2, 46, 47] (Figure 3). Female gender represented more than 50% of the study sample in 42,8% of the articles, while male gender represented more than 50% of study sample in only 14,3% of the articles included. Male and female gender representation is equal (i.e., 50% male and 50% female) in 30,3% of articles. 7 articles [6, 7, 10, 13, 16, 17, 44] presented no data on the gender of the study sample. In 29 studies majority of participants had prior experience in dancing Latin-

American dances, while in rest of the studies most of the participants had no prior experience in Latin-American dances.

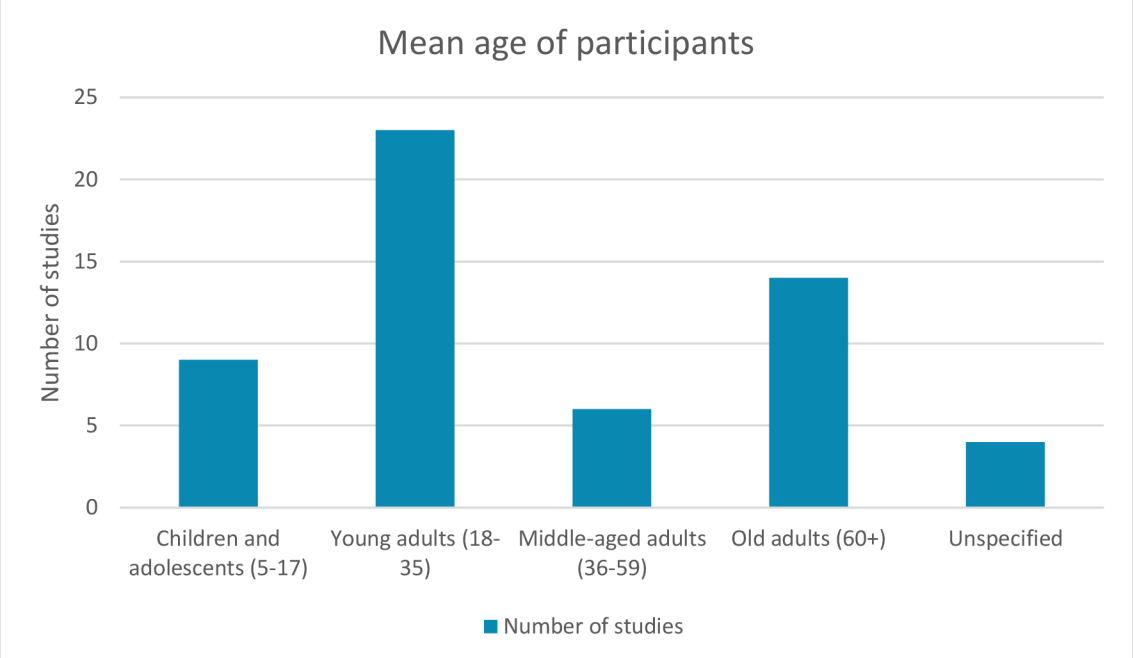

Figure 3. Mean age of study sample

5.3 Dance intervention

Out of 56 studies, 36 studies included Latin-American dancing intervention, while 20 studies were conducted without dance intervention. The most popular dance included in Latin-American dance intervention was Cha-cha-cha with 24 appearances, followed by Rumba that was danced at 20 interventions and Samba at 18 different interventions. The least popular Latin-American dances were Jive, which was danced on 14 dance interventions and Paso Doble with appearance on only 9 dance interventions from all the studies that were included in this review (Figure 4). Dance interventions were designed in the form of dance lesson or dance sessions in 27 interventions, and 9 times in form of dance competitions or dance competition simulations. The average time of each dance intervention was 70 minutes per dance intervention.

The 20 studies conducted without specific dance intervention, were all studies where the study samples were experienced dancers with many years of experience in dancing Latin-American dances.

Four studies [29, 33, 46, 56] did not define what exact Latin-American dance was danced on dance intervention and only mentioned that dance intervention included Latin dances.

5.4 Included dances in dance interventions

5.4.1 Samba

Samba was included in 21% of Latin-American dance interventions. it is included in 50% of dance interventions that investigate effects of Latin-American dances on cardiovascular health [9, 11] and successful aging [27].

5.4.2 Cha-cha-cha

Cha-Cha-Cha was the most popular dance amongst the studies, appearing in 28% of dance interventions (Figure 4). It was included in every study that examined effects of Latin-American dances on dementia and cognitive disorders [19, 24, 30]. 50% of the studies that included cancer patients in their dance interventions used cha-cha-cha as their choice of dance. One study that included dance intervention and studied its effect on musculoskeletal system also included cha-cha-cha [2]. Cha-cha-cha was the most popular dance in dance interventions where main sample were children [2, 13, 17].

5.4.3 Rumba

Rumba was the second most popular dance used in Latin-American dance intervention. It was danced in 24% of dance interventions. It appeared in 50% [14] of dance interventions where the participants were cancer patients. Rumba also appeared in the only study [49] that presents positive effects of Latin-American dancing on Immunity and body's immune function.

5.4.4 Paso doble

Paso doble was the least popular Latin-American dance included in dance interventions. It was included in total of 11% of the studies and danced exclusively only by competitive Latin-American dancers, suggesting that paso doble is not popular dance practiced at recreational and leisure dance interventions.

5.4.5 Jive

Jive was the second least popular Latin-American dance which was danced in 16% of dance interventions. It was used in 50% [2] of studies that investigate effects of Latin-American dancing on musculoskeletal system. Jive was the most popular dance (same as cha-cha-cha) in dance interventions, where participants were children [2, 13, 17].

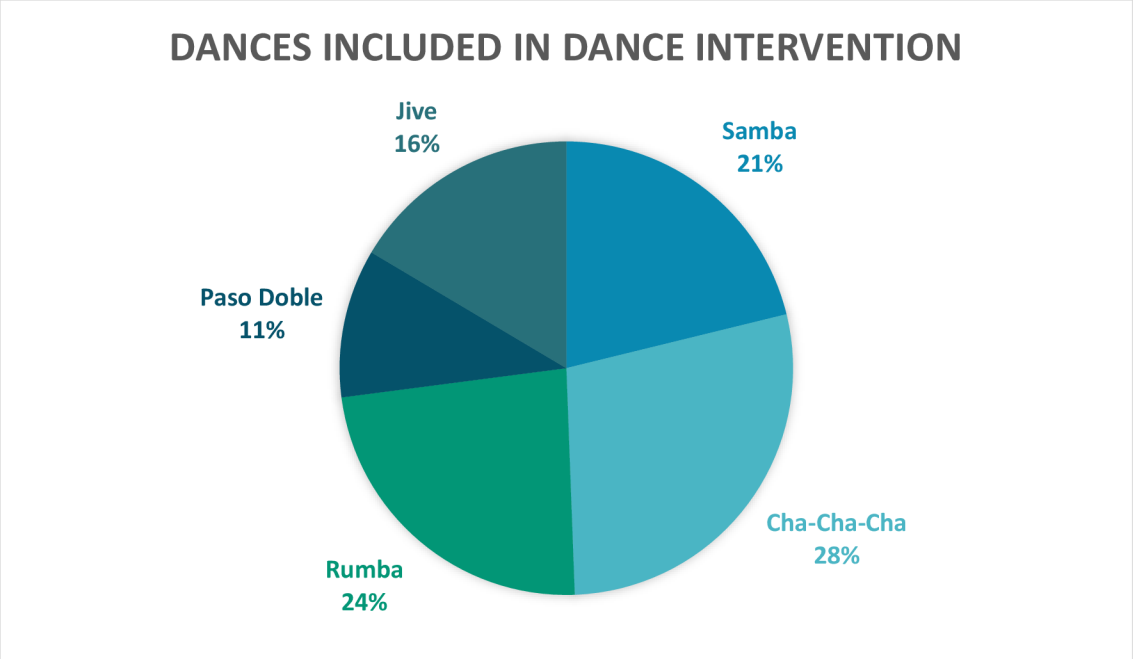

Figure 4. Percentages of inclusion of dances in dance intervention

5.5 Type of Latin-American dancing

In 30 studies Latin-American dancing was studied as a leisure activity, while in 26 studies competitive type of Latin-American dancing (dancesport) was studied, where all the study samples had many years of competitive Latin-American dancing experience.

5.6 Characteristics of study

Study measurements of the studies in the articles, were various (Table 1). 31 studies used device-measured method, 31 studies used a self-reported method, 20 studies obtained their measurements with the use of various testing methods, 4 studies [1, 7, 22, 45] involved an interview, while only one study incorporated participant observation.

Table 1

Characteristics and findings of the studies included

	First author and year of publication	Country	Characteristics of study sample	Characteristics of study	Dance intervention (Frequency, Type)	Health Topic	Main Findings
1	Andreeva & Karanauskienė, 2017	Italy	n=27 48,1% male 51,9% female Dancesport athletes	Interview Participant Observation Measures: emotional state	Dancesport competition Samba, Cha-Cha-Cha, Rumba, Paso doble, Jive	Mental health and behavior	A precompetitive emotional state before competition may be described as a complex phenomenon that consists of different psychological categories such as anxiety, arousal, stress, self-confidence, and concentration. The results of the study showed that precompetitive emotional states of dancesport athletes were both positive and negative.
2	Andrieieva et al., 2021	Ukraine	n=48 50% male 50% female 6 years Preschool-age children	Device-measured (dry spirometer, handgrip dynamometer, force platform) Measures: bio-geometric profile of posture, indicators of physical health, indicators of physical development, vertical posture stability	9-month dance program Cha-Cha-Cha, Jive*	Musculoskeletal system	Results of the study showed that coordination abilities, flexibility, strength, and biogeometric profile of posture in children improved after a 9-month dance program. Therefore, suggesting that dance exercises can be effective means of developing the children's body, posture and preventing postural disorders.

3	Angosta et al., 2015	USA	n=37 23,3% male 76,6% female 50,7 ± 8,2 years Healthy adults without prior dance experience	Self-reported (physical activity readiness questionnaire, health screening questionnaire, PACES questionnaire) Measures: resting blood pressure, heart rate, anthropometric measures, enjoyment	12 weeks, once per week, 45-minute dance intervention Cha-Cha-Cha, Rumba	Cardiovascular system	Latin-American dancing is an effective form of physical activity and has the potential to promote physical activity and improve the cardiovascular outcomes of populations who are at risk of heart disease.
4	Berndt et al., 2012	Germany	n=40 47,5% male 52,5% female 22,4 ± 2,8 years Dancesport athletes and non-dancing controls	Self-reported (Freiburg Complaint List, State-Trait-Anxiety Inventory –Trait version questionnaire) Device-measured (MEMS 6 TrackCap) Measures: well-being, health status, psychological well-being, cortisol measurements, serum levels of high sensitivity	-	Mental health and behavior	Dancesport competitors show evidence of hypoactivity in stress systems and peripheral inflammation along with more self-reported physical complaints. Dancers reported significantly higher anxiety complaints compared to controls. Therefore, competitive Latin-American dancing represents a chronic stressor that can lead to important functional consequences.
5	Blanksby & Reidy, 1988	Australia	n=20 50% male 50% female	Device-measured (Philips Cardiopan 531 ECG, Beckman OM-11 Oxygen Analyset,	Competition simulation round	Physical activity	Results of the study show that the average HR Max during competition simulation for males was 85%, while for women average

			22,5 ± 6,1 years Dancesport athletes	Sieman's Telecust36-S1, and S2 Transmitters, Sieman's Telecust36-E1 and E2) Measures: anthropometric measures, heart rate, oxygen consumption, pulmonary ventilation	Samba, Cha-Cha-Cha, Rumba, Paso Doble, Jive		HR Max was 91%. All athletes were working above 80% of VO2 max during their competition simulation round therefore competitive dancesport can be classified as heavy to extremely heavy exercise.
6	Borges et al., 2012	Brazil	n=75 77,6 ± 11,2 years Sedentary elderly subject	Device-measured (stabilometer, posture meter platform) Test (The Latin American Group for Maturity protocol) Measures: GDLAM index, balance scores	8 months, three times per week, 50-minute dance intervention Samba and Rumba*	Balance	The results of the study show that the dancing program with Latin-American dances led to an increase in the level of functional autonomy and physical balance among the elderly.
7	Borges et al., 2014	Brazil	n=59 67,5 ± 8,0 years Elderly subjects	Device-measured (Lizard stabilometric platform) Interview about fall history Measures: anthropometric measures, postural balance	12 weeks, three times per week, 50-minute dance intervention Samba*	Balance	After attending dance classes elderly subjects reduced the difference in body weight distribution and the number of falls from standing height. Ballroom and Latin-American dancing can be prescribed for better balance and motor performance of the elderly.

8	Cardoso et al., 2021	Brazil	n=320 38,4% male 61,6% female 31.4 ± 8.6 years Dancesport athletes	Self-reported (The Bulimic Inventory Test (BITE), Eating Attitudes Test (EAT), Questionnaire) Measures: anthropometric measures, BMI, body image satisfaction, anorexia nervosa score, bulimia nervosa score	-	Mental health and behavior	The results of the study demonstrate that the majority of dancers were dissatisfied with their body image. Higher scores on the EAT and BITE questionnaires were associated with dissatisfaction. Female dancers were less likely to be dissatisfied with being underweight compared to male dancers.
9	Cruz et al., 2017	Brazil	n=50 100% male 26,25 ± 5,3 years Healthy young adults	Self-reported (International Ahysical Activity Questionnaire) Device-measured (stadiometer, digital scale balance, POLAR cardiac monitor model RS800CX)	6 months, three to five times a week, 50 to 60 minutes dance intervention Samba*	Cardiovascular system	Men taking part in regular dancing lessons had lower resting HR, higher postexercise absolute HRR, and enhanced cardiorespiratory fitness compared to nondancers. Results indicate that regular dance practice of this type is associated with beneficial changes in resting chronotropic status and enhanced adaptive chronotropic responses to exercise, which

				Measures: anthropometric measures, BMI, blood pressure, heart rate			suggests that dancing lessons of this type may result in health benefits.
10	Grigore, 2017	Romania	n=24 12-13 years Children with at least 3-year experience in dancesport	Test (Test of manual laterality, test of podal laterality) Measures: manual laterality, podal laterality	-	Motor functions	Dancesport has a positive influence on the development of the manual and podal laterality, because of its specificity of motor actions. The research confirmed that many of the right-handed dancers showed a predilection for the equal use of both hands while dancing. The value of ambidextrous subjects was recorded higher at the end of the experiment, proving that dancesport significantly influenced the development of laterality ability.
11	Guidarini et al., 2013	Brazil	n=23 34.8% male 65.2% female 62.5 ± 7 years Hypertensive patients participating in	Device-measured (mercury column sphygmomanometer Sankey, stethoscope Premium, heart rate monitor Polar FS1) Measures: blood pressure, heart rate, anthropometric measurements	3 months, 3 times per week, 1-hour dance intervention Samba*	Cardiovascular system	Hypotensive response to ballroom dancing was promising, indicating that intermittent dancing exercise is adequate for cardiac rehabilitation programs. The blood pressure reduction observed in the study suggests that ballroom and Latin-American dancing combined with pharmacological treatment improves blood pressure control

			cardiac rehabilitation				and may be used as an exercise for cardiac rehabilitation.
12	Hulbert et al., 2017	England	n=24 50% male 50% female 72,5 ± 5,0 years Elderly with mild-moderate Parkinson's	Device-measured (Coda 3-dimensional motion analysis system, VNG Ulmer, Kistler force plate) Test (Standing start 180° turn test) Measure: body segment latency, weight transfer, change in body segment angle, time of turn	10 weeks, 2 times a week, 1-hour dance intervention Cha-Cha-Cha, Rumba*	Central nervous system	Subjects that were taking dancing classes were able to better coordinate their acial and perpendicular segments and surprisingly became more 'en bloc' in their turning behavior, suggesting that dancing classes are beneficial for people with Parkinson's
13	Imamović & Rašidagić, 2018	Bosnia and Herzegovina	n=32 12,4 ± 0,5 years Primary-school age children	Test (Flamingo test, horizontal balance bench tests, Bat Coordination test, Side walking test, Backwards Training Ground test, Push-up test, Back Straightening test, Lying-Sitting test)	6 weeks, three to four times a week, 45-minute dance intervention Samba, Cha-cha-cha, jive	Physical activity	Results of the study present that significant improvement was observed in coordination, strength capacity, and balance quality of primary school children after attending Latin dance classes. Latin-American dances are recommended as additional content in Physical education lessons.

				Measures: motoric status, coordination status, repetitive strength status, balance status			
14	Karkou et al., 2021	International	n=54 100% female 53,5 ±7,9 years Women with breast cancer	Test (6 min walking test, handgrip test, 30 s sit-to-stand, back scratch test, and Fullerton advanced balance scale) Self-reported (EORTC-QLQ C30 Questionnaire) Measures: Anthropometric measures, endurance, residual functional capacity, quality of life, cardiorespiratory fitness, balance, fall risk, flexibility	16 weeks, once per week, 2-hour dance intervention Cha-Cha-Cha, rumba*	Cancer	The dancing program had physical benefits on fitness levels and psychosocial benefits for women with breast cancer. Positive changes were found in weight, hip, and forearms, changes in cardiorespiratory fitness, and overall flexibility and strength. The quality-of-life measure also indicated positive changes after the intervention
15	Kattenstroth et al., 2011	Germany	n=49 28,6% male 71,4% female 71,5 ± 1,1 years Elderly with an extended history of dancesport dancing and sedentary	Self-reported (Everyday competence questionnaire, raven's standard progressive matrices) Test (Multiple-choice reaction Time measurement, Romberg test, timed up and go test,	-	Successful aging	Older subjects with an extended history of competitive ballroom dancing had much better performance than controls in terms of posture, balance, and reaction times.

			elderly with no dancing experience (controls)	standing-turn test, 2-point discrimination threshold) Measures: lifestyle, general activity levels, well-being, reaction time, posture control, balance, motor performance			
16	Kicsi & Ursu, 2019	Romania	n= n/a 6- 12 years old Primary-school age children	Test (The Ruffier test) Device-measured (digital scale, measuring device) Measures: anthropometric measures, BMI, thoracic elasticity, heart rate	6 months, two times per week, 90-minute dance intervention Cha-Cha-Cha, Jive*	Physical activity	Latin-American dancing provides significant benefits both physically and mentally. Regularly practiced dance leads to the improvement of psycho-motor coordination, heart rate, and pulmonary capacity and maintains an unaltered general state of physical health in somato-functional, psychological, and emotional components of a human being.
17	Kicsi et al., 2018	Romania	n= n/a 6-12 years old Primary-school age children	Tests (Wells-Dillon test, Flamingo test, assessment of the orientation in space and time) Measures: balance, feet and back mobility, movement coordination	6 months, two times per week, 90-minute dance intervention Cha-Cha-Cha, Jive*	Physical activity	The results for Wells and Dillon and Flamingo test indicated, for each child, significant progress in the final testing compared to initial testing. The dancing activity provides kinetoprophylactic benefits, melo-therapeutical benefits, and positive effects at a psychological level. The study suggests that this type of dance activity could improve the quality of life for

							children diagnosed with Down syndrome, ADD, or ADHD.
18	Kiliç & Nalbant, 2022	Turkey	n= 52 50% male 50% female 18-40 years Dancesport athletes and non-dancers as a controls	Device-measured (AC40 Clinical audiometer, NeuroCom Smart Balance Master) Tests (Sensory organization test, Adaptation test, Unilateral stance test, Limits of stability and Rhythmic weight shift) Measures: anterior posterior and lateral scores, postural sway, balance, postural control, stability, dynamic balance	-	Balance	Dance training can contribute to postural control and gait stabilization. Results demonstrate that dancing improves balance and posture. Adding appropriate dance activities to vestibular rehabilitation programs might be helpful
19	Kim et al., 2011	Korea	n=38 23,7% male 76,3% female 68,1 ± 4,1 Elderly patients with metabolic syndrome	Tests (Consortium to Establish a Registry for Alzheimer's disease, Short Geriatric Depression Scale) Measures: anthropometric measures, blood samples, fasting plasma, glucose, cholesterol, triglyceride, high density lipid	6 months, twice a week, 1-hour dance intervention Cha-Cha-Cha	Dementia	Dance exercise improved cognitive function in the elderly population. After the dance exercise, the total CERAD-K score increased by an average of 6.8 points. Positive effects were observed in verbal fluency, delayed recall, and recognition memory function. Dance exercise may reduce the risk for cognitive disorders in elderly people with metabolic syndrome.

20	Kruusamäe et al., 2015	Estonia	n=89 51,7% male 48,3% female 23,0 ± 5,7 years Dancesport athletes and track and field athletes	Device-measures (Lunar DPX-IQ densitometer) Measures: anthropometric measures, thoracic kyphosis, lumbar lordosis	-	Musculoskeletal system	Dancesport competitors had smaller S-shaped vertebral curvatures and significantly smaller lumbar lordosis angles compared to track and field participants. Smaller spinal curvatures in dancesport athletes may be due to regular to dancesport specific training. Loss of lordosis is associated with low back pain due to increased intradiscal pressure.
21	Kruusamäe et al., 2016	Estonia	n=130 51,5% male 48,5% female 22,8 ± 4,0 years Dancesport athletes and untrained controls	Device-measured (DPX-IQ densitometer, Martin metal anthropometer, medical electronic scale) Measures: anthropometric measures, body composition, bone mineral content	-	Musculoskeletal system	Male dancesport athletes had significantly higher whole-body BMD when compared with untrained controls. The results of the study also revealed that dancesport athletes have higher BMD values at the weight-bearing site (femoral-neck BMD) compared to healthy sedentary controls. Based on this study low BMD is not an issue for elite female dancesport athletes, despite their lower percent body fat values.
22	Kuisis et al., 2012	South Africa	n=116 50% male 50% female 19,7 ± 8,3 years Dancesport athletes	Self-reported (Questionnaire) Interview Measures: past injuries, injury classification, injury location	-	Injuries	The results of the study show that the overall incidence of injury was 0,99 per 1 000 hours of dance. There was a significant difference between males (0,49) and females (1,45) with regard to incidence of injury per 1 000 hours of dance. Acute

							injuries occurred more frequently in males (80%) and chronic injuries occurred more frequently in females (54,5%). The most frequently injured sites were ankle, foot, and toe (39,5%), followed by back and neck (23,3%). Males showed a relatively even distribution of injuries, whereas females' most frequent types of injuries were muscle spasms (24%) and blisters (21%).
23	Lankford et al., 2019	USA	n=24 50% male 50% female 22,0 ± 2,0 years Young recreational dancers	Self-reported (PAR-Q Questionnaire) Device-measured (portable metabolic system Oxycon) Measure: gas exchange, anthropometric measures	Competition round simulation Cha-Cha-Cha*	Physical activity	The finding of this study is that recreational ballroom dance can be used to meet the intensity component of the aerobic activity recommendations set by ACSM, CDC, and AHA. Recreational dance can be classified as moderate intensity exercise and vigorous intensity, depending on the tempo of the dance. Cha-Cha-Cha is classified as vigorous exercise, while slower dances are classified as moderate intensity exercise.
24	Lazarou et al., 2017	Greece	n=129 21,7% male 78,3% female 66,8 ± 10,1 years	Tests (MMSE, Montreal Cognitive Assessment Test, RBMT, FAS, NPI, GDS, BDI, Hamilton Scale for Depression, PSS, Beck Anxiety Inventory,	10 months, two times per week, 1-hour dance intervention	Dementia	Latin-American dancing has a positive impact on the maintenance of cognitive functions, mood, and behavior, without increasing the risk of cognitive deterioration. Overall after dance

			Elderly with amnestic mild cognitive impairment	FRSSD, FUCAS, TRAIL-B, ROCFT-c, RAVLT, Test of Everyday Attention) Measures: cognition, daily functionality, attention, learning and verbal fluency, memory and executive function, mood	Cha-Cha-Cha, Rumba*		intervention, the patients showed improvements in almost all investigated domains such as cognition, reaction time, visuospatial skills, selective attention, attentional switching, and mood and behavior, indicating that dancing might be an ideal option for intervention in age-related degradations, especially with people with limited social life and several cognitive limitations.
25	Liébana et al., 2017	Spain	n=16 50% male 50% female 20,5 ± 2,7 years Dancesport athletes	Device-measured (surface EMG Megawin 3.1) Measures: muscle contractions	2 separate dance interventions Rumba	Physical activity	Women had greater muscle activation and energy expenditure while dancing the rumba than their male partners.
26	Liiv et al., 2014	Estonia	n=60 50% male 50% female 22,4 ± 6,5 years Dancesport athletes	Device-measured (Martin metal anthropometer, body mass A&D Instrument, DXA, Lunar DPX-IQ densitometer, MetaMax 3B spirometry system, Polar Team System Belt) Measures: anthropometric measure, body composition,	Competition simulation, 5 rounds of dancing Samba, Cha-Cha-Cha, Rumba, Paso Doble, Jive	Cardiovascular system, Physical activity	The results of the study presented that competitive dancesport athletes have relatively high aerobic capacity. Latin American Dance discipline was found physiologically more intensive compared to Standard and Ten Dance, characterized by significantly higher HR values during all rounds of testing.

				oxygen consumption, minute ventilation, lactate concentration, heart rate			
27	Lima & Vieira, 2007	Brazil	n=60 10% male 90% female 60+ years old Elderly subjects	Self-reported (Questionnaire) Measures: well-being	1 year, two times per week, one-hour dance intervention Samba*	Successful aging	Dancing classes created a culture of inclusion that embraced both understanding and acceptance among senior citizens, which in turn might improve their quality of life. Dancing classes had rich and varied meanings for elderly dancers, ranging from its provision of fun, its perceived health benefits its stimulus to reminiscence, its connection to culture, and its usefulness for socializing. All participants perceived the classes increased their confidence to dance.
28	Manetti et al., 2015	Italy	n=150 47,3% male 52,7% female 68,4 ± 2,3 years Healthy older adults practicing dancesport and non-dancing healthy	Self-reported (standardized questionnaire, daily leisure questionnaire, Short Form-12 questionnaire) Device-measured (Attention and Concentration Software by Erickson) Test (Tinetti Test, Sit and Reach)	-	Successful aging	Subjects practicing dancesport performed significantly better in cognitive tests, motor tests, and in quality of life questionnaire (SF-12) compared to sedentary subjects and subjects who participate in adapted physical activity. Dancesport represents attractive and alternative physical activity to preserve cognitive and physical functions during aging.

			older adults (controls)	Measures: anthropometric measures, BMI, cognition scores, reaction time, attention ability, memory ability, balance, mobility, quality of life			
29	Mangeri et al., 2014	Italy	n=100 52% male 48% female 59,0 ± 8,6 years Adults with obesity or diabetes	Test (EMME-3 test, 6-min walking test) Measures: blood pressure, heart rate, fingertip glucose, Anthropometric measures, waist circumference	6 months, twice a week, 2-hour dance intervention Latin dances**	Cardiovascular system	Dance may be an effective strategy to implement physical activity in motivated subjects with type 2 diabetes or obesity.
30	Marquez et al., 2017	USA	n=57 15,7% male 84,3% female 65,6 ± 6,5 years Older Latino Adults	Device-measured (Tronix 5002 scale, Seca 803 scale, Seca 216 Stadiometer, Seca 213 Stadiometer, Welch-Allyn Spot Vital Signs LXI device, Omron HEM-907XL blood monitor) Self-reported (The Acculturation Rating Scale for Mexican Americans-II, Mini Mental State Examination)	16 weeks, twice a week, 1-hour dance intervention Cha-Cha-cha*	Dementia	Results of the study revealed that older Latino adults participating in Latin dance program showed greater improvement in episodic memory compared to the control group. Structured Latin dance programs can positively influence episodic memory and improve overall cognition among older adults.

				Measures: anthropometric measures, demographics, physical health, blood pressure			
31	Marquez et al., 2022	USA	n=333 15,6% male 84,4% female 64,9 ± 7,0 years Older adults with low PA levels, and risk for disability	Self-reported (Physical Activity Questionnaire) Device-measured (ActiGraph Model GT3X-Plus accelerometer) Measures: Anthropometric measures, levels of PA	4 months, twice a week, 1 hour Dance intervention Cha-Cha-Cha*	Successful aging	The study supports Latin dance programs to be efficacious in promoting Physical Activity among older adults. Participants in the dance program significantly improved their self-reported moderate-to-vigorous and leisure-time physical activity.
32	Massidda et al., 2011	Italy	n=10 50% male 50% female 19,0 ± 2,0 years Dancesport athletes	Device-measured (SenseWear Pro Armband) Measures: energy expenditure, anthropometric measures, BMI	2 rounds of Competition simulation Samba, Cha-Cha-Cha, Rumba, Paso Doble, Jive	Physical activity	Competitive Latin American dancing is a vigorous activity that requires the cardiovascular system to work at levels that demand high energy expenditure to match the physiological strain.
33	Meric & Ilhan, 2016	Turkey	n=60 50% male 50% female 20,3 ± 1,8 years University students	Self-reported (Self-Confidence Scale)	12 weeks, once per week, 2-hour dance intervention Latin dances**	Mental health and behavior	Post-test scores of self-confidence of students that attended Latin dance classes were found to be significantly higher compared to the controls. Suggesting that 12-week Latin dance training had increased the self-confidence of the participants.

				Measures: internal self-confidence, external self-confidence			
34	Miletic et al., 2015	International	n=200 100% male 15-40 years Dancesport athletes	Self-reported (basic data questionnaire, self-estimated functional inability because of pain questionnaire, healthcare-related questionnaire) Measures: height, weight, BMI, injury location	-	Injuries	Low back pain is age-progressive and the most frequent pain region among male dancers. Study results reveal that three of four dancers would not seek medical help over the occurrence of pain or injury. Continuing dancing with lower back pain can produce increased muscle activation to provide trunk stability which can lead to pain in the pelvic belt and shoulder regions; progressive low back pain with the risk of chronic problems; and an increase in muscle fatigue. Dancing through the pain will lead to inferior performance.
35	Muyor et al., 2017	Slovakia	n=40 50% male 50% female 23,5 ± 2,8 years Dancesport athletes and non-dancers (controls)	Device-measured (Spinal Mouse system, Uni-level inclinometer, MediMouse) Measures: thoracic kyphosis, lumbar lordosis, pelvic tilt, trunk flexion, trunk extension	-	Musculoskeletal system	Dancesport athletes competing in Latin American dances had lower thoracic kyphosis and lumbar lordosis with moderate effect size than non-dancers in standing posture. The spinal morphology of Latin American dancesport athletes is characterized by lower thoracic kyphosis, lumbar lordosis, anterior pelvic tilt, and flexible spine, especially in flexion postures.

							The specific dance postures and movements of Latin American dances modify the spinal curvatures in dancers but do not alter spinal morphology in standing.
36	Ng et al., 2019	USA	n=13 7,7% male 92,3% female 40-59 years old Subjects with multiple sclerosis	Self-reported (fatigue impact scale questionnaire, beck depression inventory questionnaire, multiple sclerosis self-efficacy scale) Device-measured (HR monitor Zephyr, BioHarness) Tests (25-ft walk test, 9-hole peg test, 3-s paced auditory serial addition test, Berg balance scale) Measures: quality of life, fatigue, depression, self-efficacy, static balance, dynamic balance	6 weeks, 2 times per week, one-hour dance intervention Rumba*	Central nervous system	Results of the study prove that Latin-American dancing can result in improved quality of life and cognition in persons with mild-to-moderate multiple sclerosis. This kind of dance intervention may also be beneficial for balance, fatigue, or depression.
37	Pellicciari et al., 2016	Italy	n=153 50,3% male 49,7% female	Self-reported (Questionnaire) Measures: injury history, BMI	-	Injuries	Dancesport athletes are subjected to risk of injury, especially strain and sprain injuries in the lower limbs. About half of the

			25,8 ± 8,9 years Dancesport athletes				dancers reported having at least 1 injury located particularly in the lower limbs and predominantly strains and sprain injuries.
38	Premelč et al., 2019	Slovenia	n=97 57,7% male 42,3% female 32,6 ± 11,5 years Dancesport athletes	Self-reported (Questionnaire, Injury history Questionnaire) Measures: anthropometric measures, BMI, training volume, injury history, type and site of injury	-	Injuries	Dancesport athletes reported that most of their injuries occurred during training (73.6%) or the competition (26.4%). The highest perceived causes of injury were overtraining (25%) and insufficient warm-up (17%). Most Dancers (72,3%) did not include any special physical conditioning besides dancing, and only 27,7% of the remaining dancers reported that they used jogging and pilates to improve their overall fitness.
39	Prus & Zaletel, 2022	Slovenia	n=101 43,5% male 56,5% female 18.9 ± 3.1 years Competitive dancers of various styles	Device-measured (InBody 720, NX-16) Measures: anthropometric measures, BMI, 3D body measurements	-	Body asymmetries	Results of body asymmetries among competitive Latin American dancers showed significant differences both in anthropometric and body composition measurements between the left and right sides of the body. Arm and leg lean mass, elbow, forearm, knee, and calf girth, were significantly higher on the right side. Because of asymmetrical dance

							choreographies, which are difficult and demanding are pushing competitive Latin American dancers to the development of one side of the body and thus gradually develop more asymmetries, which can lead to many injuries.
40	Rohleder et al., 2007	Germany	n=76 50% male 50% female 17-62 years old Dancesport athletes	Device-measured (Cortisol measures) Test (Trier social stress test) Self-reported (stress Questionnaires) Measures: perceived stress, stress factors, performance satisfaction, cortisol levels, cortisol concentrations	Dance competition, competition simulation Samba, Cha-Cha-Cha, Rumba, Paso Doble, Jive*	Mental health and behavior	The data of the study show that dancesport competitions serve as powerful stimuli affecting the HPA axis and leading to large cortisol releases. The study suggests that in the case of competitive dancesport dancing, the elements responsible for the heightened cortisol profile are the psychological rather than the physical characteristics of the competition. The cortisol response to a competition day for Latin-American dancing was greater than on a control day.
41	Sekulic et al., 2020	Slovenia	n=126 16,6% male 83,4% female 15.66 ± 1.57 years	Self-reported (Injury Questionnaire) Device-measured (InBody 720)	-	Injuries	During the study, 53% of dancers reported the occurrence of a musculoskeletal problem/injury. On average dancers suffered from 2.88 injuries per year.

			Young dance competitors	Test (Star Excursion Balance Test) Measures: sociodemographic factors, anthropometric measures, dynamic balance			Amongst dancesport athletes, 71% of men reported occurrence of musculoskeletal problem/injury, while only 29% of female athletes reported occurrence of musculoskeletal problem/injury. A higher risk of injury was evidenced in older and more experienced dancers.
42	Šifrar et al., 2020	Slovenia	n=48 50% male 50% female 21,32 ± 5,26 years Dancesport athletes	Self-reported (Big five questionnaire, Social skills Inventory, Questionnaire of emotional competence) Measures: energy, acceptability, consciousness, emotional stability, openness, personality, social skills	-	Mental health and behavior	Results of the study showed that better-performing dance couples tend to be more orderly, agreeable, and conscientious than lower-performing dance couples. The study also showed that Better-performing couples were older, more experienced with better-trained bodies and more diligent with a firm belief in their success, confident in attaining their goals, more motivated, and more emotionally stable- a trait that stemmed from their maturity.
43	Sofianidis et al., 2017	Greece	n=36 27,7% male 72,3% female 70,5 ± 5,7 years Elderly subjects	Device-measured (force platform Balance Plate 6501, magnetic tracking system Nest of Birds)	12 weeks, two sessions per week, 60-minute dance intervention Rumba*	Balance	Dancing lessons had a positive impact on factors related to the static and dynamic balance control of older adults. Dance training is an ideal form of exercise for people who have problems with rhythm perception and sensory-motor control to improve balance control in older adults.

				Tests (Two-leg tandem stance test, one-legged stance test, periodic postural sway test) Measures: center of pressure, static balance, dynamic balance, postural sway, angular displacement of the trunk			
44	Sohn et al., 2018	Korea	n=15 72 ± 5.4 years Elderly subjects	Self-reported (Physical Activity Readiness Questionnaire) Device-measured (OptiTrack S250e system, force platform AMTI OR6-7-100) Measures: walking balance, standing balance, postural stability, the center of pressure	15 weeks, three times per week, 50-minute dance intervention Cha-Cha-Cha, Rumba, Jive	Balance	The postural stability of older adults was improved after participating in 15 weeks of a dancesport training program. Results of the study suggest that dancesport can be effective exercise method for older adults to improve postural stability.
45	Stevens-Ratchford, 2016	USA	n=20 40% male 60% female 60-84 years old Older adults involved in ballroom dancing for 10+ years	Self-reported (The successful aging demographic questionnaire, The successful aging profile questionnaire) Interview	-	Successful aging	Ballroom and Latin-American dancing for older adults is a great physical activity that not only promotes their physical function but also fosters their well-being and engendered feelings of positive self-worth. The findings of this study indicated that ballroom and Latin dance as serious leisure occurred in conjunction with other

				Measures: well-being, engagement with life, health, life satisfaction, cognitive and physical functioning			longstanding participation and the participants' reports of successful aging and positive well-being.
46	Thieser et al., 2021	Germany	n=66 40,9% male 59,1% female Adult cancer patients	Self-reported (Body Image Scale, Brief Fatigue inventory, Short Scale for Measuring General Self-Efficacy Belief) Test (6-min walking test) Measures: Fatigue, Body image, Self-efficacy) Measures: body image changes, fatigue level, self-efficacy	45 weeks, once per week, 90-minute dance intervention Latin dances**	Cancer	After a 45-week dance program, all participants showed improvement in their functional exercise capacity.
47	Tomescu, 2021	Romania	n=199 36,7% male 63,3% female Hotel guests	Self-reported (questionnaire) Measures: levels of satisfaction	14 weeks, daily dance classes Samba, Cha-Cha-Cha, rumba, jive*	Physical activity	The majority of people in the program (93%) believe that the dance program has positively influenced the lifestyle they will have in the future. Latin-American dance practiced as a leisure activity contributes to harmonious physical development and broadens the horizon of evolved thinking.
48	Vukadinović, 2022	Serbia	n=98 13,3% male 86,7% female	Self-reported (Questionnaire, The Short Dark Triad,	-	Mental health and behavior	The results show that dancers had higher scores of narcissism and lower scores on Machiavellianism and sadism compared to

			34,7 ± 11,2 years Professional and non-professional dancers of various dance styles	Assessment of Sadistic Personality) Measures: Machiavellianism, psychopathy, narcissism, and sadism scores			participants from the reference community sample. Professional dancers had higher scores on narcissism, compared to those who practice dance as recreation meaning that they tend to seek prestige or status and require admiration and attention from other people more than recreationists.
49	Wang & Wang, 2021	China	n=64 50% male 50% female 19,34 ± 0,74 years University students	Device-measured (Polar telemetric heart rate monitor, BT224 semi-automatic biochemical analyser, LJX-II centrifugal precipitation machine, FACS Calibur flow cytometer) Measures: heart rate, T lymphocyte subsets, immunoglobulins IgA, IgC, IgM content	10 weeks, 3 times a week, 40 minutes dance intervention Rumba and Cha-Cha-Cha	Immunity	The results of this experiment show that the ratio of CD4+ and CD4+/ CD8+ increases after physical dance exercise. The results of the study suggest that Long-term physical dance exercise can improve the body's immune function.
50	Wang et al., 2021	China	n=20 40% male 60% female 54,8 ± 5,8 years	Self-reported (questionnaire), Measures: Anthropometric measures, systolic blood pressure, diastolic blood	3-month, first 2 weeks, 5 times a week, 60-minute dance intervention, following 10 weeks,	Physical activity	During the three-month physical dance intervention, the BMI index, body fat percentage, waist circumference, hip circumference, and thigh circumference of male and female middle-aged and elderly

			Older adults without dance experience	pressure, resting heart rate, maximum oxygen uptake, physical fitness, body function, fitness indicators, BMI	2 times a week, 90-minute dance intervention. Samba, Cha-Cha-Cha, Rumba, Paso Doble*		subjects decreased, suggesting that long-term dance exercise can better improve middle-aged and older people's body shape. The systolic blood pressure and diastolic blood pressure of male and female middle-aged and elderly subjects decreased, and the maximum oxygen uptake increased reflecting that dancing sports can effectively improve the cardiovascular function of middle-aged and elderly subjects. Female grip strength changed significantly, and arm muscle strength increased, suggesting that middle-aged and older people participating in sports dance can increase physical fitness.
51	Wanke et al., 2018	Germany	n=66 46,9% male 53,1% female 23,3 ± 4,1 years Dancesport athletes and non-dancers (controls)	Self-reported (Questionnaire on complaints in the lumbar spine region) Device-measured (Digi Max Meßsystem) Tests (Muscle function and shortening test by Janda)	-	Body asymmetries	Significant differences in strength level favoring the right side of the body in the spinal musculature region and upper extremity musculature were found in the dancers in comparison to the controls. This phenomenon was more pronounced in the spine region of male dancers than in their female counterparts. A higher right strength level of the spine and upper extremity musculature can be associated

				Measures: strength, muscle shortening, muscle function, and muscle shortening			with increased static strain while performing dance choreography.
52	Wanke et al., 2020	Germany	n=72 43% male 57% female 24,0 ± 5,7 years Dancesport athletes	Self-reported (Questionnaire) Measures: pain prevalence, pain localization, pain perception, pain assessment	-	Injuries	Pain is a highly relevant issue in Latin formation dance. Significantly more pain was observed in the lower extremity region of female dancers compared to males. Ankle joint toes, hip joint, and groin are primarily regions of discomfort for female dancers. Almost 80% of dancers continued dancing despite the pain, with the main factor being the desire to perform and responsibility to the team.
53	Xu & Li, 2021	China	n=32 50% male 50% female 20,8 ± 1,3 years Dancesport athletes	Self-reported (Basic Questionnaire) Device-measured (Hologic 3Dimensions Mammography System, spirometry system MetaMax 3B and Cortex) Test (Incremental Treadmill Test)	2 rounds of Competition Simulation Samba, Cha-Cha-Cha, Rumba, Paso Doble, Jive	Physical activity	The results of the study present that Dancesport is a high-intensity and high-energy consumption physical activity. During dancesport competitions, numerous physiological levels and stress reactions influence the energetics of athletes.

				Measures: heart rate, oxygen consumption, metabolic rate, anthropometric measures, blood lactate density, minute ventilation, metabolic energy			
54	Zaletel et al., 2011	Slovenia	n=6 50% male 50% female Years n/a Dancesport athletes	Device-measured (Camera Ultrak CCD Color KC 7501 CP, optical lens Ultrak KL2814IS, system SAGIT) Measures: athlete's location, speed, acceleration	1 round of competition simulation Samba, Cha-Cha-Cha, Rumba, Paso doble, Jive	Physical activity	The study results show us that of all 5 Latin-American dances Samba and Paso doble are the most dynamic and progressive dances, while cha-cha-cha, rumba, and jive are more static and non-progressive. Top class dancesport athletes travel on average around 75 meters, while performing samba and paso doble for 1 minute and 30 seconds, while in other dances meters traveled while performing vary from 44 to 59 meters traveled.
55	Zanchini & Malaguti, 2014	Italy	n=20 50% male 50% female 24,4 ± 3,6 years Dancesport athletes	Device-measured (Sensewear Armband) Measures: basal metabolic rate, daily energy level, training energy expenditure, metabolic equivalent, physical activity level	4-hour Dancesport training session and 2-hour competition simulation Samba, Cha-Cha-Cha, Rumba, Paso Doble and Jive*	Physical activity	Dancesport is a moderate/heavy activity that induces strong energy expenditure. Athletes involved in Dancesport show a vigorous Physical Activity Level.

56	Zhang et al., 2021	China	n=901 43,62% male 56,38% female 19,40 ± 2,08 years University students practicing dancesport and non-dancing students (controls)	Self-reported (Generalized Anxiety Disorder 7 scale, Patient Health Questionnaire-9) Measures: anxiety score, depression score	1 semester, 4 times per week. 90 minutes dance intervention Latin dances**	Mental health and behavior.	Frequent dance activity positively alleviated the depression levels in university students, reasons for this may be that frequent dancers had more chance to be exposed to the active environment during dance practice, and physical well-being obtained from exercise may also improve mental health.

*Also, other types of dances were included

**Individual Latin dances not specified

PA – physical activity, BMI – body mass index, RBMT – Rivermead behavioral memory test, FAS – Verbal fluency test, NPI – Neuropsychiatric inventory, BDI – Beck depression inventory, PSS – Perceived stress scale, FRSSD – Functional rating scale for dementia, FUCAS – Functional and cognitive assessment test, TRAIL-B – Trail making test part-B, ROCFT-c – Rey Osterrieth complex figure test copy and delay recall, RAVLT – Rey auditory verbal learning test, EORTC-QLQ – The European organisation for research and treatment of cancer quality of life, GDLAM- The protocol of the Latin American group for maturity

5.7 Main findings related to health topic

5.7.1 Physical activity

Twelve studies suggest that the inclusion of Latin-American dances in regular physical activity programmes leads to an overall improvement in physical fitness and well-being [2, 5, 13, 16, 17, 23, 25, 32, 47,50, 53, 54, 55]. After attending Latin-American dance classes, significant improvements in coordination ability, strength, and balance quality were reported among primary school children. Latin-American dances are recommended as additional content in physical education lessons in school [13]. Recreational Latin-American dancing can be used to meet the intensity component of the aerobic activity recommended by ACSM, CDC, and AHA. Recreational Latin-American dancing can be classified as moderate-vigorous exercise and can be an effective entry point for increased aerobic fitness [23]. Recreational dancing of this type is a great way to increase physical fitness, improve body shape and quality of life [50] while maintaining positive psychological and emotional components of a human being [47]. Competitive Latin-American dancing is a high-intensity and high-energy consumption physical activity. While dancing Latin-American dances in a competition setting, numerous physiological levels and stress reactions influence the energetics of athletes [53]. Competitive Latin-American dancing is classified as moderate/heavy and in some cases even as heavy/extremely heavy [5] physical activity that induces a strong energy expenditure [55] and requires the cardiovascular system to work at levels that demand high energy expenditure to match the physiological strain [32]. Dancesport athletes dancing Latin-American dances show vigorous physical activity levels [55]. Participating in Latin-American dancesport activities can be a great way to improve physical fitness for adults and older adults [50].

Maintaining an active life through dance is extremely beneficial for any individual regardless of age, gender, or social status [17].

5.7.2 Mental health and behaviour

Frequent Latin-American dancing activity reduces depression levels, reasons for this may be that dancers are exposed to an active environment during dance lessons, and the physical well-being of being physically active may also contribute to the improvement of mental health. Frequent Latin-American dancing may serve as a protective factor for preventing depression [56].

After attending 12-week Latin dance training programme self-confidence of recreational dancers was found to be significantly higher compared to the previous scores [33].

Competitive Latin-American dancers show higher scores of narcissism, compared to those who practice dance recreationally. Meaning that competitive dancers seek admiration and attention from other people more than recreational dancers [46]. The emotional states of competitive Latin-American and dancesport dancers before and during competition can be divided into two groups: positive and negative emotional states. Positive states are: joy, fun, adrenaline, confidence, and excitement, while negative, while negative are: anxiety, nervousness, fear and worry [1]. Another study confirms that competitive dancesport dancers engaged in Latin-American dances reported high scores of anxiety and bodily complaints, which maybe mirrors to the poorer health status reported by the dancers [4]. The majority of competitive dancesport dancers are dissatisfied with their body image [8]. Study results show that competitive dancers' cortisol values are significantly higher during dancesport competition, this may be due to the psychological characteristics of dancesport competition [40].

Competitive Latin-American and dancesport dancing represents a chronic stressor that can lead to important functional consequences and poorer health [4].

5.7.3 Injuries

Five studies have shown that the most frequent site of injury for male and female Latin-American dancers were the lower limbs and lower back [22, 37, 38, 41, 52]. The most common types of injuries included muscle spasms, strains or tears, and knee joint/ligament derangement [22, 37, 38]. Competitive Dancers reported that most of their injuries occurred during training (73,6%) or dancing competition (26,4%). The highest perceived causes of injury were overtraining (25%) and insufficient warm-up (17%) [38]. The majority of Latin-American dancers continue dancing through the pain and discomfort, with the main factor being the desire to perform [52]. On average Latin-American, dancers suffer from 2,88 injuries per year [38]. Studies report different results in relation to injury occurrence between males and females. Two studies [22, 38] report a significantly higher risk of injuries in females dancing Latin-American dances compared to males, while one study [41] reports that males involved in Latin-American dances were more injured than their female partners. A higher risk for injury is present in older and more experienced dancers [41]. The occurrence of lower back pain was recorded as age-progressive and is the most frequent in male dancers. The older the dancers are, the more frequent are their reports of pain in the lower back region. Most of the dancers continue dancing through the pain and thus risk of chronic problems increases. Dancing through the pain leads to inferior dance performance [34].

5.7.4 Cardiovascular system

Latin-American dancing is an effective form of physical activity and has the potential to improve cardiovascular outcomes in populations who are at risk of heart disease [3]. Results of one study indicate that frequent Latin-American dance practice is associated with beneficial changes in resting chronotropic status and cardiovascular physiological adaptations, which suggests that dancing lessons of Latin-American dances may result in health benefits [9]. Another study reported promising hypotensive responses to the Latin-American dancing program. This type of dancing programme may be used for cardiac rehabilitation, as the blood pressure reduction observed in the study suggests that Latin-American dancing combined with pharmacological treatment improves blood pressure control [11].

Latin-American dancing is also recommended for patients diagnosed with type 2 diabetes or obesity. Latin-American dancing as a leisure-time physical activity improves metabolic control and overall physical fitness [29].

Competitive Latin-American dancing is categorized as a vigorous physical activity that requires the cardiovascular system to work at levels that require high energy expenditure to match high physiological strain during competition performance [5].

5.7.5 Balance

Five studies, comprising 237 subjects, tested if Latin-American dancing activity contributes to improved balance and postural control. Subjects in dance intervention programs dance the samba, chachacha, rumba, and jive. The results show that dancing programs that incorporate Latin-American dancing can be recommended to the elderly for better balance, postural control, and gait stabilization [6, 7, 18, 43, 44]. After attending dance classes elderly subjects reduced number of falls from the standing height [7]. Dancing lessons had a positive impact on static and dynamic balance control of the elderly, thus dance training is an ideal form of exercise for people with balance, sensory-motor, and postural stability problems [43, 44].

5.7.6 Successful aging

Three studies evaluated 219 elderly subjects with an extended history of dancing Latin-American dances [13, 28, 45]. Two studies suggest that ballroom dancing and Latin-American dancing promote well-being, physical, and cognitive functions and that this type of dancing as serious leisure activity promotes successful aging [28, 45].

Two studies incorporated samba and cha-cha-cha in their dance intervention. Participants in both programmes significantly increased their leisure-time physical activity [31] and found the dance lessons as a great way to socialize and increase their confidence [27].

5.7.7 Musculoskeletal system

Four studies observed relation between Latin-American dances and the musculoskeletal system [2, 20, 21, 35]. One study showed that a 9-month dance programme, which incorporated cha-cha-cha and jive, had positive effects on the development of pre-school age children's posture and was an effective exercise for the prevention of postural disorders [2]. In 3 studies the participants were dancesport athletes with an extended history of Latin-American dancing [20, 21, 35]. Results show that movements of competitive Latin-American dances modify the spinal curvature. Latin-American dances are characterized by smaller lumbar lordosis [20,35], anterior pelvic tilt, flexible spine, and smaller spinal curvatures, which may be present due to specific training in Latin-American dances. Latin-American dancesport athletes have high whole-body bone mass density. Even with low percent body fat in most female Latin-American competitors, low bone mass density is not an issue for female dancers [21].

5.7.8 Dementia

Three studies were conducted on the effects of Latin-American dances on cognition function and dementia. All 3 studies included cha-cha-cha [19, 24, 30], while one also included Latin-American dance rumba [24]. Dance interventions improved cognitive function in the elderly and may reduce the risk of cognitive disorders such as dementia.

5.7.9 Cancer

Two studies were conducted with participants diagnosed with cancer [14, 46]. Breast cancer was the most popular type of cancer diagnosed among the participants of the Latin-American dance programme. After both dance interventions, patients diagnosed with cancer showed positive changes in fitness levels and quality of life measures. This type of dancing program can be recommended as alternative physical activity for cancer patients, long-term participation can be associated with high self-efficacy, physical benefits, psychological benefits, and an active lifestyle [46].

5.7.10 Central nervous system

Two studies were conducted on patients with a disorder of the central nervous system [12, 36]. After dance intervention persons with multiple sclerosis reported increased quality of life and improved cognition [36]. Another study suggests that dancing classes with Latin-American dances are beneficial for people suffering from the Parkinson's disease, as the patients improved their coordination and turning behavior [12].

5.7.11 Body asymmetries

Two studies observed asymmetries in competitive dancers with an extended history of Latin-American dancing [39, 51]. Both studies reported that Latin-American dancers showed significant differences between the left and the right sides of the body, with arm and leg mass, elbow, forearm, knee, calf girt, and overall strength level being higher on the right side of the body [39, 51]. Latin-American dancers perform and practice their asymmetrical dance choreographies, which are difficult and demanding, and in consequence develop one side of the body more than the other, which can lead to many injuries [39].

5.7.12 Motor functions

Findings of one study suggest that dance interventions that include Latin-American dances have a positive influence on the development of psychomotor skills of children aged between 12 and 13 years old. The study proved that Latin-American dancing, because of its specificity of motor actions, significantly influenced the development of laterality [10].

5.7.13 Immunity

One study investigated the influence of Latin-American and dancesport dances on the body's immune function. The results of the study reveal that after dance intervention subjects showed an increased ratio of T cells CD4+ and CD4+/CD8+ and an increase in the body's immunity. Long term dance program which incorporates Latin-American dances can improve the body's immune function [49].

5.8 Common positive effects

This scoping review shows that Latin-American dancing and dance interventions, which include Latin-American dances may induce physical, mental, cognitive, motor, and postural positive effects. Many studies recommended leisure time Latin-American dance exercise and

competitive Latin-American dancing for its numerous positive effects. Many studies recommended Latin-American dancing as a great form of physical activity [2, 5, 13, 16, 17, 23, 25, 32, 47,50, 53, 54, 55] especially because of its great contribution to the overall fitness of the participants [9, 14, 38, 50]. Latin-American dancing also helped with the development of the children's coordination abilities [2, 13], posture [2], and quality of life [17]. Another common positive effect of dance exercise with Latin-American dances is an improvement of balance [6, 7, 13, 15, 18, 36, 43] and coordination abilities amongst the elderly [2, 10, 13, 16]. Latin-American dancing has a great effect on cardiovascular functions [3, 5, 11, 50], the body's immune function [49], and can also improve the well-being [45, 56], of participants attending frequent dance classes.

Overall frequent Latin-American dancing is recommended as it promotes many positive effects of a healthy lifestyle and physical and mental well-being.

5.9 Common negative effects

No negative effects were detected in the studies, where the participants were leisure time dancers. Negative effects of Latin-American dances on human health were identified only amongst competitive dancers and dancesport athletes [1, 4, 8, 20, 35, 37, 38, 39, 51, 52]. Three studies identified Latin-American dancing as a stressor on human mental health [1, 4, 8]. The nature of dancesport competitions and performance anxiety is a common cause of stress and mental ill-being amongst competitive Latin-American dancers [1, 4]. One study presented, that majority of dancers competing in Latin-American dancers were dissatisfied with their looks and their body image [8]. Two studies observed body asymmetries among competitive Latin-American dancers and identified that dancers practicing Latin dances have a stronger developed right side of the body, which can lead to the gradual development of more body asymmetries and increased occurrence of new injuries [38, 39]. Because of competitive dancing's heavy load on the human body, the occurrence of injuries amongst dancesport athletes is quite common. The most common injuries of dance athletes are muscle spasms, tears and strains in lower limbs, and pain in the lower back area [22, 37, 38, 41, 52]. Two studies identified that dancers competing in Latin-American dancers have smaller spinal curvatures and lower lumbar lordosis, which can be associated with low back pain [20, 35].

6 DISCUSSION

Latin-American dances proved to have positive effects on human health among dancers that practiced Latin-American dances both recreationally and competitively. Negative effects of Latin-American dances were identified only in dancers that practiced Latin-American dances competitively and were frequently competing on dancesport competitions.

The results of this review of literature confirm the findings of previous studies researching the relationship between dance and health, which indicated that recreational dance can improve cardiovascular fitness, bone health, physical fitness, improve mental health (Burkhardt & Brennan, 2012; Fong Yan et al., 2018) and promote wellbeing and good health (Sheppard & Broughton, 2020).

In total 56 studies from 19 different countries were examined with a mean age range of participants from 6 to 88 years. Results of this thesis suggest that cha-cha-cha is the most popular Latin-American dance used in dance interventions for its positive health benefits as it appeared in most dance interventions. It was followed in popularity closely by Rumba and Samba. Results of the review suggest that Latin-American dance paso doble is not enjoyed dance by recreational and leisure time dancers as it was mentioned only in studies where participants were competitive Latin-American dancers, and not mentioned or practiced in studies and dance interventions where participants were recreational dancers. Dance interventions featuring Latin-American dances had a positive impact on participants, improving physical fitness, well-being, coordination ability, strength, static and dynamic balance, self-confidence, blood pressure levels, metabolic control, postural control, cognitive function, bone mass density, quality of life, psychomotor skills, body immunity, as well as reducing depression levels. Samba was danced in the majority of dance interventions revolving around cardiovascular health and balance and proved to have a positive effect on cardiorespiratory fitness, blood pressure control, and balance control. Cha-cha-cha, the most popular Latin-American dance danced on Latin-American dance interventions, had positive effects on the cognitive function of older adults. Rumba was another popular dance, which can be associated with positive effects on balance control and coordination abilities. The findings of this thesis suggest that Latin-American dance intervention can positively contribute to the development of children's coordination abilities, flexibility, strength, posture, and laterality. Dancing interventions with Latin-American dances may also be beneficial for older adults and the elderly, as participation in dance lessons incorporating Latin-American dances positively improved physical fitness, balance, coordination, postural stability, cognitive function and reduced the risk of cognitive disorders. Negative effects of Latin-American dances were presented only in studies where participants

were competitive dancers with an extended history of competitive (dancesport) Latin-American dancing. Common negative effects of Latin-American dances on health were stress and anxiety before and during dancesport competitions, negative self-perspective, body asymmetries, smaller spinal curvatures, lower lumbar lordosis, and lower limbs and lower back injuries. These findings confirm that dancesport competitors practicing and competing in Latin-American dances are at risk of physical injuries and mental ill-being, as dancesport competitions represent chronic stressor to dancesport athletes (Berndt et al., 2012).

7 CONCLUSION

This review of the literature suggests that Latin-American dance intervention presents a great form of physical activity and may be beneficial for both healthy people and people with various health disorders, of all ages from 6 to 88 years. Latin-American dances present numerous physical and mental health benefits both as a recreational activity and competitive activity, as well as some negative effects of competitive Latin-American dancing on dancers in form of physical injuries and mental ill-being.

8 SOUHRN

Hlavním cílem této bakalářské práce bylo zmapovat dostupné informace z databází o latinsko-amerických tancích a zdraví. S využitím klíčových slov byla vytvořena strategie řešení, byla vytvořena kritéria pro zařazení a vyloučení literárních dokumentů na čtyřech databázích. Byly prohledány databáze Scopus, PubMed, EBSCO a Web of Science a bylo identifikováno celkem 3961 článků. Po odstranění duplikátů a prověření názvů článků a abstraktů se počet článků zúžil na 237 článků. Úplné znění článků bylo důkladně přečteno a na základě předem stanovených kritérií pro zařazení a vyloučení bylo vybráno 56 studií. Údaj o autorovi, rok publikace, geografické umístění studie, charakteristika zkoumaného vzorku (velikost vzorku, procento mužské a ženské populace, průměrný věk, popis vzorku), charakteristika studie (metody, měření), frekvence a typ taneční intervence, téma zdraví a hlavní zjištění byly vyjmuty a uvedeny v tabulce 1, která uvádí souhrnné informace o článcích zahrnutých v mé přehledové studii. Byla uvedena geografická poloha zahrnutých studií, poté následovalo popsání studijního vzorku zahrnutého do studií. Byly prezentovány typy tanečních intervencí, latinsko-americké tance zahrnuté v tanečních intervencích a charakteristika studií. V další podkapitole byly prezentovány hlavní poznatky o účincích latinsko-amerických tanců na fyzickou aktivitu, duševní zdraví a chování, úrazy, kardiovaskulární systém, rovnováhu, úspěšné stárnutí, pohybový aparát, demenci, rakovinu, centrální nervový systém, tělesné asymetrie, motorické funkce, a imunitu, po nichž následovaly společné pozitivní a negativní účinky, které měly intervence latinsko-amerického tance na populační skupinu studií.

9 SUMMARY

The main aim of this thesis was to map out available information from databases on Latin-American dances and health. A search strategy was created with the usage of keywords, inclusion and exclusion criteria were formed for the literature search on four databases. Scopus, PubMed, EBSCO, and Web of Science databases were searched and a total of 3961 articles were identified. After removing the duplicates and screening the article titles and abstracts the article count was narrowed down to 237 articles. The full text of articles was read thoroughly and based on predetermined inclusion and exclusion criteria 56 studies were selected for inclusion in the review. Data on authors, year of publication, study setting, characteristics of the study sample (sample size, percentage of male and female population, mean age, description of the sample), characteristics of study (methods, measurements), frequency, and type of dance intervention, health topic, and main findings were extracted and presented in Table 1, which presents summarized information about the articles included in the review. The geographic location of included studies was presented, followed by the presentation of the study sample included in the studies. Type of dance interventions, Latin-American dances included in dance interventions, and characteristics of studies were presented. In the next subsection main findings on the effects of Latin-American dances on physical activity, mental health and behaviour, injuries, cardiovascular system, balance, successful aging, musculoskeletal system, dementia, cancer, central nervous system, body asymmetries, motor functions, and immunity were presented, followed by common positive and negative effects Latin-Dance interventions had on the population group of the studies.

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